United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with Virginia Polytechnic Institute and State University

Soil Survey of Dinwiddie Area, Virginia

How To Use This Soil Survey

General Soil Map

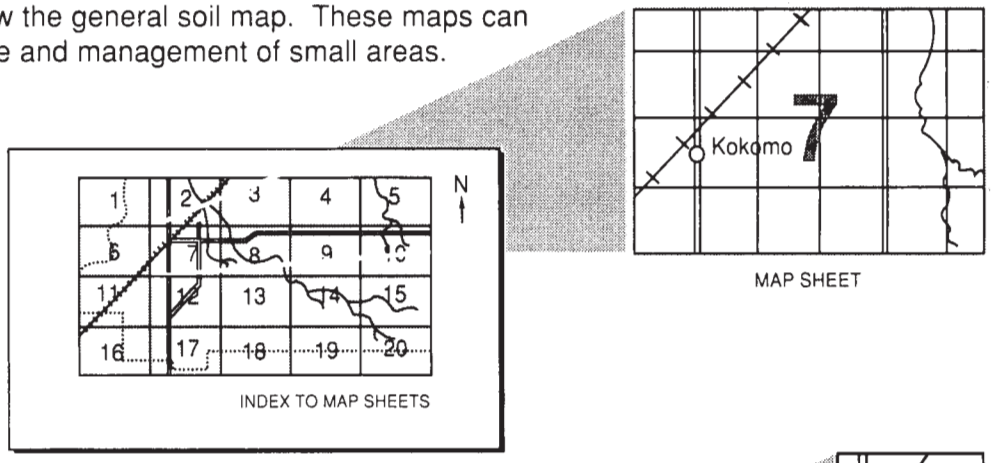
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

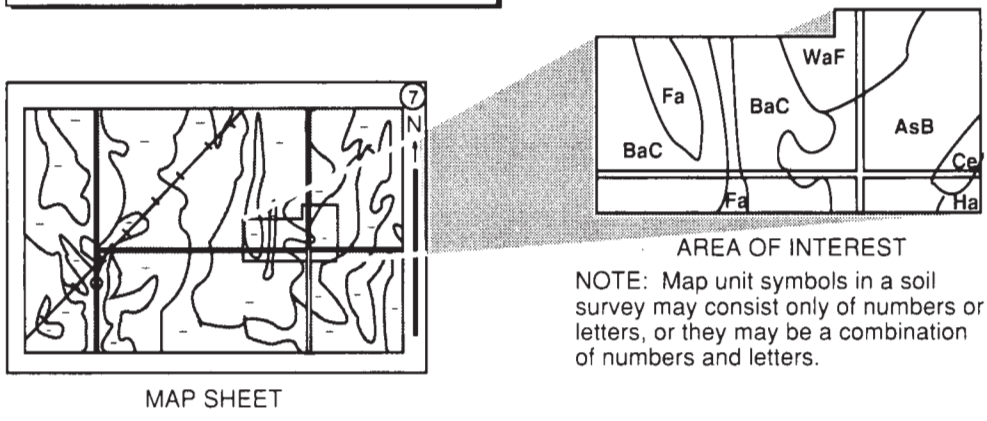
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1988. Soil names and descriptions were approved in 1991. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1988. This survey was made cooperatively by the Natural Resources Conservation Service and the Virginia Polytechnic Institute and State University. It is part of the technical assistance furnished to the Appomattox River Soil and Water Conservation District. Financial assistance was provided by the Virginia Department of Conservation and Recreation and the Dinwiddie County Board of Supervisors.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Natural Resources Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: A homestead and tobacco in an area of Cecil sandy loam, 2 to 7 percent slopes.

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Issued August 1996

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Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Dinwiddie County, the city of Colonial Heights, and the city of Petersburg. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

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Soil Survey of Dinwiddie Area, Virginia

Fieldwork by James A. Clausen, Daniel J. Crowner, Joanne B. Dixon, and Jerry S. Quesenberry, Natural Resources Conservation Service

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
Virginia Polytechnic Institute and State University

Dinwiddie County and the cities of Colonial Heights and Petersburg are in south-central Virginia (fig. 1). The survey area has a total area of 514 square miles, or 329,000 acres. Dinwiddie County has an area of 483 square miles, or 309,300 acres; Colonial Heights has an area of about 8 square miles, or 5,000 acres; and Petersburg has an area of about 23 square miles, or 14,700 acres. Dinwiddie County offices are in the town of Dinwiddie, which is in the central part of the county.

Forestry and farming are the major land uses in the survey area. Most wood is harvested for the pulp industry. Most of the farms produce corn, soybeans, small grain, and tobacco. Swine, cattle, and chickens are the major types of livestock raised in the survey area.

Transportation needs are served by highway and railroad systems. Interstate Highway 95 runs from north to south through the eastern part of the survey area. It runs through Colonial Heights and Petersburg. Interstate Highway 85 runs from east to west from Petersburg through the central part of Dinwiddie County. U.S. Highway 460 runs from east to west through the northern part of Dinwiddie County and Petersburg. U.S. Highway 1 runs parallel to Interstate Highway 85. Two railways serve the area. One line runs north and south and then southwest through the central part of Dinwiddie County, roughly parallel to Interstate Highway 95. The other line runs from east to west through the northern part of Dinwiddie County and Petersburg.

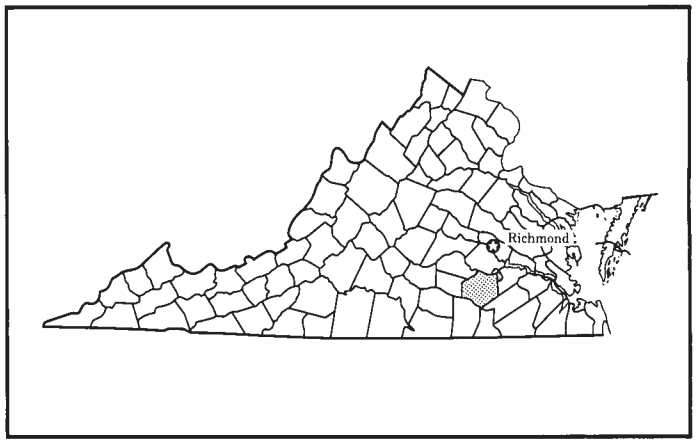

Figure 1.—Location of Dinwiddie County and the cities of Colonial Heights and Petersburg in Virginia.

General Nature of the Survey Area

This section provides general information about the survey area. It describes the climate of the area and the patterns of physiography, relief, and drainage.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Fort Pickett in the period 1973 to 1993. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 37.1 degrees F and the average daily minimum temperature is 25.1 degrees. In summer, the average temperature is 74.7 degrees and the average daily maximum temperature is 87.0 degrees.

Growing degree days are shown in table 1. They are

equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 45.76 inches. Of this, 23.3 inches, or 51 percent, usually falls in April through September. The growing season for most crops falls within this period.

The average seasonal snowfall is about 12 inches.

Physiography, Relief, and Drainage

The survey area straddles the fall line between two physiographic regions. The Coastal Plain physiographic region is in the eastern one-third of the survey area, and the Piedmont Plateau is in the western two-thirds. Elevation ranges from about 70 to 170 feet in the Coastal Plain and from 150 to 400 feet in the Piedmont Plateau.

The Coastal Plain has a gently rolling topography consisting of nearly level and gently sloping summits and shoulders in the uplands and sloping and moderately steep side slopes along small drainageways. Streams, such as Stony Creek, Sappony Creek, and Rowanly Creek, flow through areas that have steeper side slopes and are on narrow flood plains in the western part of the Coastal Plain. The flood plains broaden and have less steep side slopes as they meander east through the Coastal Plain.

The Piedmont Plateau has rolling topography consisting of gently sloping and sloping ridges and moderately steep slopes along drainageways. It is highly dissected with well defined drainageways in a dendritic pattern. Although most of the soils are well drained or moderately well drained, some poorly drained soils are in the drainageways. Some areas of soils that are somewhat poorly drained are on upland flats east and south of McKenney. Narrow to broad flood plains are associated with the Namozine and Appomattox Rivers on the northern boundary and the Nottoway River on the southern boundary.

The southern part of Dinwiddie County is drained by the Nottoway River. The northern part of Dinwiddie County and the cities of Colonial Heights and Petersburg are drained by the Appomattox River. The Namozine River is a tributary of the Appomattox River. The Appomattox River is tidal and has been navigational in the past up to the fall line, in the area of Petersburg.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists

classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The suitability for crops and pasture, woodland, and urban development is rated in each general soil map unit. The ratings and the general criteria used for their selection are as follows:

Well suited.—The intended use may be initiated and maintained by using the standard materials and methods typically required for that use. Good results can be expected.

Moderately suited.—The soils have limitations that make special planning, design, or maintenance necessary for the intended use.

Poorly suited.—The intended use is difficult or costly to initiate and maintain because of such limitations as steep slopes, a high water table, or flooding. Major soil reclamation, special design, or intensive management practices are needed.

Very poorly suited.—The intended use is very difficult or costly to initiate and maintain and generally should not be undertaken.

1. Appling-Cecil

Setting

Topography: Gently sloping to moderately steep Piedmont uplands
Slope range: 2 to 25 percent
Elevation: 150 to 400 feet

Composition

Percent of the survey area: 44 percent
Extent of components in the map unit:
Appling soils—49 percent
Cecil soils—21 percent
Minor soils—30 percent

Soil Properties and Features

Appling

Landscape position: Upland summits, shoulders, and side slopes
Depth: Very deep
Drainage class: Well drained
Parent material: Residuum derived from acid crystalline rock
Textural class: Dominantly clayey
Permeability: Moderate

Cecil

Landscape position: Upland summits, shoulders, and side slopes
Depth: Very deep
Drainage class: Well drained
Parent material: Residuum derived from acid crystalline rock
Textural class: Dominantly clayey
Permeability: Moderate

Minor Soils

- The well drained, clayey Georgeville and Herndon soils on upland summits, shoulders, and side slopes
- The moderately well drained, clayey Helena and Iredell soils on upland toe slopes and saddles and in drainageways
- The moderately well drained, clayey Mattaponi soils on broad upland summits and shoulders
- The poorly drained, clayey Roanoke soils on flood plains and terraces and in broad, depressional flats

Use and Management

Primary land use: Cropland
Secondary land uses: Woodland, pasture, and urban development

Cropland and pasture

Appling soils: Well suited to poorly suited; management concerns—slope
Cecil soils: Well suited to poorly suited; management concerns—slope
Minor soils: Well suited to poorly suited; management concerns—slope, wetness, and flooding

Woodland

Appling soils: High potential productivity
Cecil soils: High potential productivity
Minor soils: High or very high potential productivity; management concerns—wetness and flooding

Urban development

Appling soils: Well suited to moderately suited; management concerns—slope, permeability, and low strength
Cecil soils: Well suited to moderately suited; management concerns—slope, permeability, and low strength
Minor soils: Well suited to poorly suited; management concerns—slope, wetness, permeability, low strength, shrink-swell potential, and flooding

2. Herndon-Georgeville

Setting

Topography: Gently sloping to moderately steep Piedmont uplands
Slope range: 2 to 25 percent
Elevation: 150 to 350 feet

Composition

Percent of the survey area: 17 percent
Extent of components in the map unit:
Herndon soils—41 percent
Georgeville soils—33 percent
Minor soils—26 percent

Soil Properties and Features

Herndon

Landscape position: Upland summits, shoulders, and side slopes
Depth: Very deep
Drainage class: Well drained
Parent material: Residuum derived from fine grained rock, such as Carolina slate
Textural class: Dominantly clayey and loamy
Permeability: Moderate

Georgeville

Landscape position: Upland summits, shoulders, and side slopes
Depth: Very deep
Drainage class: Well drained
Parent material: Residuum derived from fine grained rock, such as Carolina slate
Textural class: Dominantly clayey
Permeability: Moderate

Minor Soils

• The well drained, clayey Appling and Cecil soils on upland summits, shoulders, and side slopes
• The moderately well drained, clayey Helena and Iredell soils on upland toe slopes and saddles and in drainageways
• The moderately well drained, clayey Mattaponi soils on upland summits and shoulders
• The poorly drained, clayey Roanoke soils on flood plains and terraces, in depressions, and on broad flats

Use and Management

Primary land use: Woodland
Secondary land uses: Cropland and pasture

Cropland and pasture

Herndon soils: Well suited to poorly suited; management concerns—slope
Georgeville soils: Well suited to poorly suited; management concerns—slope
Minor soils: Well suited to poorly suited; management concerns—slope, wetness, and flooding

Woodland

Herndon soils: High potential productivity
Georgeville soils: High potential productivity
Minor soils: High or very high potential productivity; management concerns—wetness and flooding

Urban development

Herndon soils: Well suited to moderately suited; management concerns—slope, permeability, and low strength
Georgeville soils: Well suited to moderately suited; management concerns—slope, permeability, and low strength
Minor soils: Well suited to poorly suited; management concerns—slope, wetness, permeability, low strength, shrink-swell potential, and flooding

3. Iredell-Herndon-Georgeville

Setting

Topography: Gently sloping to moderately steep Piedmont uplands
Slope range: 2 to 25 percent
Elevation: 150 to 350 feet

Composition

Percent of the survey area: 3 percent

Extent of components in the map unit:
Iredell soils—55 percent
Herndon soils—18 percent
Georgeville soils—14 percent
Minor soils—13 percent

Soil Properties and Features

Iredell

Landscape position: Toe slopes, saddles, and drainageways
Depth: Very deep
Drainage class: Moderately well drained
Parent material: Residuum derived from basic crystalline rock
Textural class: Dominantly clayey
Permeability: Slow

Herndon

Landscape position: Upland summits, shoulders, and side slopes
Depth: Very deep
Drainage class: Well drained
Parent material: Residuum derived from fine grained rock, such as Carolina slate
Textural class: Dominantly clayey
Permeability: Moderate

Georgeville

Landscape position: Upland summits, shoulders, and side slopes
Depth: Very deep
Drainage class: Well drained
Parent material: Residuum derived from fine grained rock, such as Carolina slate
Textural class: Dominantly clayey
Permeability: Moderate

Minor Soils

• The well drained, clayey Appling and Cecil soils on upland summits, shoulders, and side slopes
• The moderately well drained, clayey Helena soils on upland toe slopes and saddles and in drainageways
• The moderately well drained, clayey Mattaponi soils on upland summits and shoulders
• The poorly drained, clayey Roanoke soils on flood plains and terraces, in depressions, and on broad flats

Use and Management

Primary land use: Woodland
Secondary land uses: Cropland and pasture

Cropland and pasture

Iredell soils: Poorly suited; management concerns—slope, wetness, and poor tilth
Herndon soils: Well suited to poorly suited; management concerns—slope
Georgeville soils: Well suited to poorly suited; management concerns—slope
Minor soils: Well suited to poorly suited; management concerns—slope, wetness, and flooding

Woodland

Iredell soils: High potential productivity; management concerns—shrink-swell potential and wetness
Herndon soils: High potential productivity
Georgeville soils: High potential productivity
Minor soils: High or very high potential productivity; management concerns—wetness and flooding

Urban development

Iredell soils: Poorly suited; management concerns—wetness, slope, shrink-swell potential, permeability, and low strength
Herndon soils: Well suited to moderately suited; management concerns—slope, permeability, and low strength
Georgeville soils: Well suited to moderately suited; management concerns—slope, permeability, and low strength
Minor soils: Well suited to poorly suited; management concerns—slope, wetness, permeability, low strength, and flooding

4. Mattaponi-Appling-Cecil

Setting

Topography: Gently sloping to moderately steep Piedmont uplands
Slope range: 2 to 25 percent
Elevation: 150 to 300 feet

Composition

Percent of the survey area: 11 percent
Extent of components in the map unit:
Mattaponi soils—52 percent
Appling soils—31 percent
Cecil soils—11 percent
Minor soils—6 percent

Soil Properties and Features

Mattaponi

Landscape position: Upland summits and shoulders
Depth: Very deep
Drainage class: Moderately well drained
Parent material: Fluvial and marine sediments that cap acid crystalline rock residuum
Textural class: Dominantly clayey
Permeability: Moderately slow or moderate

Appling

Landscape position: Upland summits, shoulders, and side slopes

Depth: Very deep
Drainage class: Well drained
Parent material: Residuum derived from acid crystalline rock
Textural class: Dominantly clayey
Permeability: Moderate

Cecil

Landscape position: Upland summits, shoulders, and side slopes
Depth: Very deep
Drainage class: Well drained
Parent material: Residuum derived from acid crystalline rock
Textural class: Dominantly clayey
Permeability: Moderate

Minor Soils

- The well drained, clayey Georgeville and Herndon soils on upland summits, shoulders, and side slopes
- The moderately well drained, clayey Helena and Iredell soils on upland toe slopes and saddles and in drainageways
- The poorly drained, clayey Roanoke soils on flood plains and terraces, in depressions, and on broad flats

Use and Management

Primary land use: Woodland
Secondary land uses: Cropland, pasture, and urban development

Cropland and pasture

Mattaponi soils: Well suited to poorly suited; management concerns—slope
Appling soils: Well suited to poorly suited; management concerns—slope
Cecil soils: Well suited to poorly suited; management concerns—slope
Minor soils: Well suited to poorly suited; management concerns—slope, wetness, and flooding

Woodland

Mattaponi soils: High potential productivity
Appling soils: High potential productivity
Cecil soils: High potential productivity
Minor soils: High or very high potential productivity; management concerns—wetness and flooding

Urban development

Mattaponi soils: Well suited to poorly suited; management concerns—wetness, shrink-swell potential, permeability, and low strength
Appling soils: Well suited to moderately suited; management concerns—slope, permeability, and low strength
Cecil soils: Well suited to moderately suited; management concerns—slope, permeability, and low strength
Minor soils: Well suited to poorly suited; management concerns—slope, wetness, permeability, low strength, shrink-swell potential, and flooding

5. Roanoke-Slagle-Mattaponi

Setting

Topography: Gently sloping to sloping coastal plain summits, shoulders, and side slopes in the uplands; terraces and nearly level flood plains
Slope range: 0 to 2 percent on the flood plains, 0 to 10 percent in the uplands
Elevation: 70 to 170 feet

Composition

Percent of the survey area: 3 percent
Extent of components in the map unit:
Roanoke soils—54 percent
Slagle soils—16 percent
Mattaponi soils—14 percent
Minor soils—16 percent

Soil Properties and Features

Roanoke

Landscape position: Flood plains and terraces
Depth: Very deep
Drainage class: Poorly drained
Parent material: Fluvial sediments
Textural class: Clayey and loamy
Flooding: Occasional, for brief periods
Permeability: Very slow or slow

Slagle

Landscape position: Upland flats, toe slopes, saddles, side slopes, and drainageways
Depth: Very deep
Drainage class: Moderately well drained
Parent material: Fluvial and marine sediments
Textural class: Loamy
Permeability: Moderately slow or moderate in the subsoil, moderately slow to moderately rapid in the substratum

Mattaponi

Landscape position: Broad upland flats, summits, shoulders, and side slopes
Depth: Very deep
Drainage class: Moderately well drained
Parent material: Fluvial and marine sediments
Textural class: Dominantly clayey
Permeability: Moderately slow or moderate

Minor Soils

• The well drained, loamy Emporia and Uchee soils on upland flats, summits, shoulders, and side slopes
• The moderately well drained, loamy Altavista soils on stream terraces
• The poorly drained, loamy Myatt soils on broad stream terraces and upland flats

Use and Management

Primary land use: Woodland
Secondary land uses: Cropland, pasture, and urban development

Cropland and pasture

Roanoke soils: Poorly suited; management concerns—flooding and wetness
Slagle soils: Well suited
Mattaponi soils: Well suited
Minor soils: Well suited to poorly suited; management concerns—wetness

Woodland

Roanoke soils: Very high potential productivity; management concerns—wetness and flooding
Slagle soils: Very high potential productivity
Mattaponi soils: High potential productivity
Minor soils: High or very high potential productivity; management concerns—wetness

Urban development

Roanoke soils: Poorly suited; management concerns—flooding, wetness, permeability, and low strength
Slagle soils: Moderately suited to poorly suited; management concerns—wetness, permeability, and low strength
Mattaponi soils: Well suited to poorly suited; management concerns—wetness, shrink-swell potential, permeability, and low strength
Minor soils: Well suited to poorly suited; management concerns—wetness, permeability, and low strength

6. Emporia-Mattaponi-Slagle

Setting

Topography: Broad, nearly level to sloping coastal plain uplands
Slope range: 0 to 10 percent
Elevation: 80 to 170 feet

Composition

Percent of the survey area: 19 percent
Extent of components in the map unit:
Emporia soils—32 percent
Mattaponi soils—23 percent
Slagle soils—20 percent
Minor soils—25 percent

Soil Properties and Features

Emporia

Landscape position: Flats, toe slopes, saddles, drainageways, summits, shoulders, and side slopes
Depth: Very deep
Drainage class: Well drained
Parent material: Fluvial and marine sediments
Textural class: Loamy
Permeability: Moderately slow or moderate in the upper part of the subsoil, slow or moderately slow in the lower part

Mattaponi

Landscape position: Broad upland flats, summits, shoulders, and side slopes
Depth: Very deep
Drainage class: Moderately well drained
Parent material: Fluvial and marine sediments
Textural class: Dominantly clayey
Permeability: Moderately slow or moderate

Slagle

Landscape position: Upland flats, toe slopes, saddles, side slopes, and drainageways
Depth: Very deep
Drainage class: Moderately well drained
Parent material: Fluvial and marine sediments
Textural class: Loamy
Permeability: Moderately slow or moderate in the subsoil, moderately slow to moderately rapid in the substratum

Minor Soils

• The well drained, loamy Uchee soils on upland flats, summits, shoulders, and side slopes
• The well drained, clayey Appling and Cecil soils on Piedmont upland summits, shoulders, and side slopes
• The moderately well drained, loamy Altavista and Nansemond soils on stream terraces
• The poorly drained, fine-loamy Myatt soils on upland flats and stream terraces
• The poorly drained, clayey Roanoke soils on flood plains and terraces, in depressions, and on broad flats
• Udorthents and Urban land in areas that have been developed for urban uses

Use and Management

Primary land use: Woodland
Secondary land uses: Cropland, pasture, and urban development

Cropland and pasture

Emporia soils: Well suited
Slagle soils: Well suited

Mattaponi soils: Well suited
Minor soils: Well suited to poorly suited; management concerns—wetness and flooding

Woodland

Emporia soils: High potential productivity
Slagle soils: Very high potential productivity
Mattaponi soils: High potential productivity
Minor soils: High or very high potential productivity; management concerns—wetness

Urban development

Emporia soils: Well suited to poorly suited; management concerns—wetness, shrink-swell potential, permeability, and low strength
Slagle soils: Moderately suited to poorly suited; management concerns—wetness, permeability, and low strength
Mattaponi soils: Well suited to poorly suited; management concerns—wetness, shrink-swell potential, permeability, and low strength
Minor soils: Well suited to poorly suited; management concerns—wetness, flooding, permeability, and low strength

7. Mattaponi-Emporia-Slagle

Setting

Topography: Broad, nearly level to moderately steep uplands
Slope range: 0 to 25 percent
Elevation: 80 to 170 feet

Composition

Percent of the survey area: 3 percent
Extent of components in the map unit:
Mattaponi soils—42 percent
Emporia soils—34 percent
Slagle soils—15 percent
Minor soils—9 percent

Soil Properties and Features

Mattaponi

Landscape position: Broad upland flats, summits, shoulders, and side slopes
Depth: Very deep
Drainage class: Moderately well drained
Parent material: Fluvial and marine sediments
Textural class: Dominantly clayey
Permeability: Moderately slow or moderate

Emporia

Landscape position: Flats, toe slopes, saddles, drainageways, summits, shoulders, and side slopes
Depth: Very deep
Drainage class: Well drained
Parent material: Fluvial and marine sediments
Textural class: Loamy
Permeability: Moderately slow or moderate in the upper part of the subsoil, slow or moderately slow in the lower part

Slagle

Landscape position: Upland flats, toe slopes, saddles, side slopes, and drainageways
Depth: Very deep
Drainage class: Moderately well drained
Parent material: Fluvial and marine sediments
Textural class: Loamy
Permeability: Moderately slow or moderate in the subsoil, moderately slow to moderately rapid in the substratum

Minor Soils

• The well drained, loamy Uchee soils on coastal plain upland flats, summits, shoulders, and side slopes
• The poorly drained, fine-loamy Myatt soils on stream terraces and coastal plain flats
• The poorly drained, clayey Roanoke soils on flood plains and terraces, in depressions, and on broad flats

Use and Management

Primary land use: Woodland
Secondary land uses: Cropland and pasture

Cropland and pasture

Mattaponi soils: Well suited
Emporia soils: Well suited
Slagle soils: Well suited
Minor soils: Well suited to poorly suited; management concerns—wetness and flooding

Woodland

Mattaponi soils: High potential productivity
Emporia soils: High potential productivity
Slagle soils: Very high potential productivity
Minor soils: High or very high potential productivity; management concerns—wetness

Urban development

Mattaponi soils: Well suited to poorly suited; management concerns—wetness, shrink-swell potential, permeability, and low strength
Emporia soils: Well suited to poorly suited; management concerns—wetness, shrink-swell potential, permeability, and low strength
Slagle soils: Moderately suited to poorly suited; management concerns—wetness, permeability, and low strength
Minor soils: Well suited to poorly suited; management concerns—wetness, flooding, permeability, and low strength

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under the heading "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Appling sandy loam, 2 to 7 percent slopes, is a phase of the Appling series.

Some map units are made up of two or more major soils. These map units are called soil complexes. A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous area, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Appling-Urban land complex, 0 to 7 percent slopes, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Urban land is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The "Glossary" defines many of the terms used in describing the soils.

The suitability for crops and pasture, woodland, and urban development is rated in each detailed soil map unit. The ratings and the general criteria used for their selection are as follows:

Well suited.—The intended use may be initiated and maintained by using the standard materials and methods typically required for that use. Good results can be expected.

Moderately suited.—The soils have limitations that make special planning, design, or maintenance necessary for the intended use.

Poorly suited.—The intended use is difficult or costly to initiate and maintain because of such limitations as steep slopes, a high water table, or flooding. Major soil reclamation, special design, or intensive management practices are needed.

Very poorly suited.—The intended use is very difficult or costly to initiate and maintain and generally should not be undertaken.

Soil Descriptions

1A—Altavista fine sandy loam, 0 to 2 percent slopes, occasionally flooded. This soil is very deep, moderately well drained, and level or nearly level. It formed in loamy fluvial sediments on stream terraces in the eastern part of the county, primarily along Stony

Creek. Individual areas range from about 5 to 25 acres in size. The chance of flooding is 5 to 50 percent in any year under usual weather conditions.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches, brown fine sandy loam

Subsoil:
10 to 15 inches, brownish yellow sandy clay loam that has strong brown mottles
15 to 22 inches, yellowish brown clay loam that has reddish yellow mottles
22 to 30 inches, yellowish brown sandy clay loam that has reddish yellow and light brownish gray mottles
30 to 37 inches, yellowish brown sandy clay loam that has light brownish gray mottles
37 to 42 inches, light yellowish brown sandy clay loam that has light brownish gray and yellowish brown mottles
42 to 49 inches, light brownish gray sandy clay loam that has yellowish brown mottles

Substratum:
49 to 72 inches, mottled gray and yellowish brown, stratified sandy loam and loamy sand

Included with this soil in mapping are Roanoke and State soils. The poorly drained Roanoke soils are on flood plains and terraces. The well drained State soils are in landscape positions similar to those of the Altavista soil. Included soils make up about 15 percent of the map unit.

Important properties of the Altavista soil—

Permeability: Moderate
Depth to the water table: 18 to 30 inches
Available water capacity: High
Surface runoff: Slow
Shrink-swell potential: Low
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Extremely acid to moderately acid

This soil is used mainly for cultivated crops. Some areas are used as woodland.

This soil is well suited to cultivated crops, especially soybeans and corn. Crop yields can be increased by applying lime and fertilizer. Surface leaching of plant nutrients occurs, and sulfates, calcium, magnesium, and potassium tend to accumulate in the upper part of the subsoil. Soil tests should include both the surface layer and the upper part of the subsoil for proper interpretation of residual fertility levels. The cation-exchange capacity is relatively low, and a starter application of a complete fertilizer is needed. Split applications of nitrogen are recommended for crops that require nitrogen. Applications of lime are needed for most commonly grown crops. Wet soil material adheres to peanuts during harvesting, resulting in broken pegs, reduced yields, and lower grades. Tile drainage is effective in reducing wetness. Small grain tends to become lodged. The erosion potential is low.

This soil is well suited to pasture grasses and legumes. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is very high. The estimated annual production of wood per acre is 150 cubic feet. Wetness limits the use of equipment.

This soil is poorly suited to building site development. It is limited by the flooding and the wetness. Protecting the soil from flooding and providing a foundation drainage system help to overcome these limitations.

This soil is poorly suited to septic tank absorption fields. It is limited by the flooding and the wetness. Protecting the soil from flooding and placing the absorption field above the level of the seasonal high water table help to overcome these limitations.

This soil is moderately suited to local roads and streets. It is limited by the flooding.

The capability subclass is IIw. The woodland ordination symbol is 9A.

1B—Altavista fine sandy loam, 2 to 6 percent slopes, occasionally flooded. This soil is very deep, moderately well drained, and gently sloping. It formed in loamy unconsolidated fluvial sediments on stream terraces in the eastern part of the county, primarily along Stony Creek. Individual areas range from about 5 to 50 acres in size. The chance of flooding is 5 to 25 percent in any year under usual weather conditions.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches, brown fine sandy loam

Subsoil:
10 to 15 inches, brownish yellow sandy clay loam that has strong brown mottles
15 to 22 inches, yellowish brown clay loam that has reddish yellow mottles
22 to 30 inches, yellowish brown sandy clay loam that has reddish yellow and light brownish gray mottles

30 to 37 inches, yellowish brown sandy clay loam that has light brownish gray mottles
37 to 42 inches, light yellowish brown sandy clay loam that has light brownish gray and yellowish brown mottles
42 to 49 inches, light brownish gray sandy clay loam that has yellowish brown mottles

Substratum:
49 to 72 inches, mottled gray and yellowish brown, stratified sandy loam and loamy sand

Included with this soil in mapping are Roanoke and State soils. The poorly drained Roanoke soils are on flood plains and terraces. The well drained State soils are in landscape positions similar to those of the Altavista soil. Included soils make up about 15 percent of the map unit.

Important properties of the Altavista soil—

Permeability: Moderate
Depth to the water table: 18 to 30 inches
Available water capacity: High
Surface runoff: Medium
Shrink-swell potential: Low
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Extremely acid to moderately acid

This soil is used mainly for cultivated crops. Some areas are used as woodland.

This soil is well suited to cultivated crops, especially soybeans and corn. Crop yields can be increased by applying lime and fertilizer. Surface leaching of plant nutrients occurs, and sulfates, calcium, magnesium, and potassium tend to accumulate in the upper part of the subsoil. Soil tests should include both the surface layer and the upper part of the subsoil for proper interpretation of residual fertility levels. The cation-exchange capacity is relatively low, and a starter application of a complete fertilizer is needed. Split applications of nitrogen are recommended for crops that require nitrogen. Applications of lime are needed for most commonly grown crops. Wet soil material adheres to peanuts during harvesting, resulting in broken pegs, reduced yields, and lower grades. Small grain tends to become lodged. The erosion potential is medium. Conservation tillage and conservation cropping systems that include grasses and legumes help to control runoff and erosion.

This soil is well suited to pasture grasses and legumes. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is very high. The estimated annual production of wood per acre is 150 cubic feet. Wetness limits the use of equipment.

This soil is poorly suited to building site development. It is limited by the flooding and the wetness. Protecting the soil from flooding and providing a foundation drainage system help to overcome these limitations.

This soil is poorly suited to septic tank absorption fields. It is limited by the flooding and the wetness. Protecting the soil from flooding and placing the absorption field above the level of the seasonal high water table help to overcome these limitations.

This soil is moderately suited to local roads and streets. It is limited by the flooding.

The capability subclass is IIe. The woodland ordination symbol is 9A.

2B—Appling sandy loam, 2 to 7 percent slopes. This soil is very deep, well drained, and gently sloping. It formed in residuum derived from acid crystalline rock on upland summits and shoulders in the western part of the county. Individual areas range from about 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches, olive brown sandy loam

Subsurface layer:
7 to 11 inches, brownish yellow sandy loam

Subsoil:
11 to 16 inches, brownish yellow sandy clay loam
16 to 33 inches, brownish yellow clay that has red mottles
33 to 43 inches, brownish yellow sandy clay loam that has red mottles

Substratum:
43 to 72 inches, yellowish red sandy loam

Included with this soil in mapping are Cecil, Helena, Mattaponi, and Roanoke soils. The well drained Cecil soils are redder than the Appling soil. They are in landscape positions similar to those of the Appling soil. The moderately well drained Helena soils are on toe slopes, in saddles, and along drainageways. The moderately well drained Mattaponi soils are in landscape positions similar to those of the Appling soil. The poorly drained Roanoke soils are in low, flat depressions. Also included are soils that have a thinner solum than the Appling soil and soils that have a gravelly surface layer. Included soils make up about 15 percent of the map unit.

Important properties of the Appling soil—

Permeability: Moderate
Depth to the water table: More than 60 inches
Available water capacity: Moderate
Surface runoff: Medium
Shrink-swell potential: Low
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid or strongly acid

This soil is used mainly for cultivated crops. Some areas are used as woodland.

This soil is well suited to cultivated crops, especially soybeans, tobacco, small grain, and corn. In some areas it has a loamy surface layer that has a high content of gravel. Because the plow layer holds only limited amounts of moisture, plant nutrients are leached from the surface. The soil is moderately droughty. Crop yields can be increased by applying lime and fertilizer. The cation-exchange capacity is relatively low, and starter applications of complete plant nutrients are needed. Plant nutrients, such as sulfates, calcium, magnesium, and potassium, tend to accumulate in the upper part of the subsoil. Soil tests should include both the surface layer and the subsoil for proper interpretation of residual fertility levels. Applications of lime are needed for most crops. Split applications of nitrogen are needed for crops that require nitrogen. The erosion potential is medium. Conservation tillage and conservation cropping systems that include grasses and legumes help to control runoff and erosion.

This soil is well suited to pasture grasses and legumes. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 110 cubic feet. The soil can be easily managed for timber production.

This soil is well suited to building site development.

This soil is well suited to septic tank absorption fields. Increasing the size of the absorption field helps to overcome the moderate permeability.

This soil is well suited to local roads and streets. It is limited by low strength. Using a suitable road base material helps to overcome this limitation.

The capability subclass is IIe. The woodland ordination symbol is 8A.

2C—Appling sandy loam, 7 to 15 percent slopes. This soil is very deep, well drained, and sloping. It formed in residuum derived from acid crystalline rock on upland side slopes in the western part of the county. Individual areas range from about 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches, olive brown sandy loam

Subsurface layer:
7 to 11 inches, brownish yellow sandy loam

Subsoil:
11 to 16 inches, brownish yellow sandy clay loam
16 to 33 inches, brownish yellow clay that has red mottles
33 to 43 inches, brownish yellow sandy clay loam that has red mottles

Substratum:
43 to 72 inches, yellowish red sandy loam

Included with this soil in mapping are Cecil, Helena, Mattaponi, and Roanoke soils. The well drained Cecil soils are redder than the Appling soil. They are in landscape positions similar to those of the Appling soil. The moderately well drained Helena soils are on toe slopes, in saddles, and along drainageways. The moderately well drained Mattaponi soils are in landscape positions similar to those of the Appling soil. The poorly drained Roanoke soils are in low, flat depressions. Also included are soils that have a thinner solum than the Appling soil and soils that have a gravelly surface layer. Included soils make up about 15 percent of the map unit.

Important properties of the Appling soil—

Permeability: Moderate
Depth to the water table: More than 60 inches
Available water capacity: Moderate
Surface runoff: Rapid
Shrink-swell potential: Low
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid or strongly acid

This soil is used mainly as woodland. Some areas are used for cultivated crops.

This soil is moderately suited to cultivated crops, especially soybeans, tobacco, small grain, and corn. In some areas it has a loamy surface layer that has a high content of gravel. Because the plow layer holds only limited amounts of moisture, plant nutrients are leached from the surface. The soil is moderately droughty. Crop yields can be increased by applying lime and fertilizer. The cation-exchange capacity is relatively low, and starter applications of complete plant nutrients are needed. Plant nutrients, such as sulfates, calcium,

magnesium, and potassium, tend to accumulate in the upper part of the subsoil. Soil tests should include both the surface layer and the subsoil for proper interpretation of residual fertility levels. Applications of lime are needed for most crops. Split applications of nitrogen are needed for crops that require nitrogen. The erosion potential is high. Conservation tillage and conservation cropping systems that include grasses and legumes help to control runoff and erosion.

This soil is moderately suited to pasture grasses and legumes. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 110 cubic feet. The soil can be easily managed for timber production.

This soil is well suited to building site development. It is limited by the slope. Special architectural design helps to overcome this limitation.

This soil is moderately suited to septic tank absorption fields. It is limited by the moderate permeability and the slope. Increasing the size of the absorption field and placing the field on the contour help to overcome these limitations.

This soil is well suited to local roads and streets. It is limited by low strength and the slope. Using a suitable road base material and using special designs help to overcome these limitations.

The capability subclass is IIIe. The woodland ordination symbol is 8A.

2D—Appling sandy loam, 15 to 25 percent slopes. This soil is very deep, well drained, and moderately steep. It formed in residuum derived from acid crystalline rock on upland side slopes in the western part of the county. Individual areas range from about 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches, olive brown sandy loam

Subsurface layer:
7 to 11 inches, brownish yellow sandy loam

Subsoil:
11 to 16 inches, brownish yellow sandy clay loam
16 to 33 inches, brownish yellow clay that has red mottles
33 to 43 inches, brownish yellow sandy clay loam that has red mottles

Substratum:
43 to 72 inches, yellowish red sandy loam

Included with this soil in mapping are Cecil, Helena, Mattaponi, and Roanoke soils. The well drained Cecil soils are redder than the Appling soil. They are in landscape positions similar to those of the Appling soil. The moderately well drained Helena soils are on toe slopes, in saddles, and along drainageways. The moderately well drained Mattaponi soils are in landscape positions similar to those of the Appling soil. The poorly drained Roanoke soils are in low, flat depressions. Also included are soils that have a thinner solum than the Appling soil and soils that have a gravelly surface layer. Included soils make up about 15 percent of the map unit.

Important properties of the Appling soil—

Permeability: Moderate
Depth to the water table: More than 60 inches
Available water capacity: Moderate
Surface runoff: Rapid
Shrink-swell potential: Low
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid or strongly acid

This soil is used mainly as woodland. Some areas are used for cultivated crops.

This soil is poorly suited to cultivated crops. The slope is the main limitation. The erosion potential is high. Conservation tillage and conservation cropping systems that include grasses and legumes help to control runoff and erosion.

This soil is poorly suited to pasture grasses and legumes. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 110 cubic feet. The soil can be easily managed for timber production.

This soil is moderately suited to building site development. It is limited by the slope. Special architectural design helps to overcome this limitation.

This soil is moderately suited to septic tank absorption fields. It is limited by the moderate permeability and the slope. Increasing the size of the absorption field and placing the field on the contour help to overcome these limitations.

This soil is well suited to local roads and streets. It is limited by low strength and the slope. Using a suitable road base material and using special designs help to overcome these limitations.

The capability subclass is IVe. The woodland ordination symbol is 8A.

3B—Appling-Urban land complex, 0 to 7 percent slopes. This map unit consists of a very deep, well drained, gently sloping soil and areas of Urban land. It is on upland summits and shoulders in the western part of the county. It is about 40 percent Appling soil, 40 percent Urban land, and 20 percent other soils. Individual areas range from about 5 to 200 acres in size. The Appling soil and the areas of Urban land are so intermingled that it is not practical to map them separately.

The typical sequence, depth, and composition of the layers of the Appling soil are as follows—

Surface layer:
0 to 7 inches, olive brown sandy loam

Subsurface layer:
7 to 11 inches, brownish yellow sandy loam

Subsoil:
11 to 16 inches, brownish yellow sandy clay loam
16 to 33 inches, brownish yellow clay that has red mottles
33 to 43 inches, brownish yellow sandy clay loam that has red mottles

Substratum:
43 to 72 inches, red sandy loam

The Urban land consists of asphalt, concrete, buildings, or other impervious surfaces.

Included in mapping are Cecil, Helena, Mattaponi, and Roanoke soils and Udorthents. The well drained Cecil soils are redder than the Appling soil. They are in landscape positions similar to those of the Appling soil. The moderately well drained Helena soils are on toe slopes, in saddles, and along drainageways. The moderately well drained Mattaponi soils are in landscape positions similar to those of the Appling soil. The poorly drained Roanoke soils are in low, flat depressions. Udorthents are variable in composition. They are in landscape positions similar to those of the Appling soil. Also included are soils that have a thinner solum than the Appling soil and soils that have a gravelly surface layer. Included soils make up about 15 percent of the map unit.

Important properties of the Appling soil—

Permeability: Moderate
Depth to the water table: More than 60 inches
Available water capacity: Moderate
Surface runoff: Medium
Shrink-swell potential: Low
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid or strongly acid

This map unit is used mainly for urban development. It is not suited to cultivated crops, pasture grasses and legumes, or woodland.

This map unit is well suited to building site development.

This map unit is serviced by community sewer systems in most areas. The Appling soil is well suited to septic tank absorption fields. Increasing the size of the absorption field helps to overcome the moderate permeability.

This map unit is well suited to local roads and streets. The Appling soil is limited by low strength. Using a suitable road base material helps to overcome this limitation.

No capability subclass is assigned. The woodland ordination symbol for the Appling soil is 8A.

3C—Appling-Urban land complex, 7 to 15 percent slopes. This map unit consists of a very deep, well drained, sloping soil and areas of Urban land. It is on upland side slopes in the western part of the county. It is about 40 percent Appling soil, 40 percent Urban land, and 20 percent other soils. Individual areas range from about 5 to 200 acres in size. The Appling soil and the areas of Urban land are so intermingled that it is not practical to map them separately.

The typical sequence, depth, and composition of the layers of the Appling soil are as follows—

Surface layer:
0 to 7 inches, olive brown sandy loam

Subsurface layer:
7 to 11 inches, brownish yellow sandy loam

Subsoil:
11 to 16 inches, brownish yellow sandy clay loam
16 to 33 inches, brownish yellow clay that has red mottles
33 to 43 inches, brownish yellow sandy clay loam that has red mottles

Substratum:
43 to 72 inches, red sandy loam

The Urban land consists of asphalt, concrete, buildings, or other impervious surfaces.

Included in mapping are Cecil, Helena, Mattaponi, and Roanoke soils and Udorthents. The well drained Cecil soils are redder than the Appling soil. They are in landscape positions similar to those of the Appling soil. The moderately well drained Helena soils are on toe slopes, in saddles, and along drainageways. The

moderately well drained Mattaponi soils are in landscape positions similar to those of the Appling soil. The poorly drained Roanoke soils are in low, flat depressions. Udorthents are variable in composition. They are in landscape positions similar to those of the Appling soil. Also included are soils that have a thinner solum than the Appling soil and soils that have a gravelly surface layer. Included soils make up about 15 percent of the map unit.

Important properties of the Appling soil—

Permeability: Moderate
Depth to the water table: More than 60 inches
Available water capacity: Moderate
Surface runoff: Rapid
Shrink-swell potential: Low
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid or strongly acid

This map unit is used mainly for urban development. It is not suited to cultivated crops, pasture grasses and legumes, or woodland.

This map unit is well suited to building site development. It is limited by the slope. Special architectural design helps to overcome this limitation.

This map unit is serviced by community sewer systems in most areas. The Appling soil is moderately suited to septic tank absorption fields. It is limited by the moderate permeability and the slope. Increasing the size of the absorption field and placing the field on the contour help to overcome these limitations.

This map unit is well suited to local roads and streets. The Appling soil is limited by low strength. Using a suitable road base material helps to overcome this limitation.

No capability subclass is assigned. The woodland ordination symbol for the Appling soil is 8A.

4B—Cecil sandy loam, 2 to 7 percent slopes. This soil is very deep, well drained, and gently sloping. It formed in residuum derived from acid crystalline rock on upland summits and shoulders in the western part of the county. Individual areas range from about 5 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, dark yellowish brown sandy loam

Subsurface layer:
2 to 9 inches, strong brown sandy loam

Subsoil:
9 to 12 inches, red clay loam
12 to 47 inches, red clay
47 to 55 inches, red clay loam

Substratum:
55 to 72 inches, red sandy clay loam

Included with this soil in mapping are Appling, Helena, Mattaponi, and Roanoke soils. The well drained Appling soils are brownish yellow. They are in landscape positions similar to those of the Cecil soil. The moderately well drained Helena soils are on toe slopes, in saddles, and along drainageways. The moderately well drained Mattaponi soils are in landscape positions similar to those of the Cecil soil. The poorly drained Roanoke soils are in low, flat depressions. Also included are soils that have a thinner solum than the Cecil soil and soils that have a surface layer of clay loam. Included soils make up about 15 percent of the map unit.

Important properties of the Cecil soil—

Permeability: Moderate
Depth to the water table: More than 60 inches
Available water capacity: Moderate
Surface runoff: Medium
Shrink-swell potential: Low
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid to slightly acid in the surface layer and subsurface layer; very strongly acid or strongly acid in the subsoil and substratum

This soil is used mainly for cultivated crops. Some areas are used as woodland.

This soil is well suited to cultivated crops, especially flue-cured tobacco, corn, and soybeans. Crop production is limited by low fertility, a low content of organic matter, and acidity. Crop yields can be increased by applying lime and fertilizer. The erosion potential is medium. A conservation tillage system and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion. Planting cover crops reduces the hazard of wind erosion.

This soil is well suited to pasture grasses and legumes. The low fertility, the low content of organic matter, and the acidity are limitations. Using the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and increases the runoff rate and the hazard of erosion. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per

acre is 110 cubic feet. The soil can be easily managed for timber.

This soil is well suited to building site development.

This soil is well suited to septic tank absorption fields. Increasing the size of the absorption field helps to overcome the moderate permeability.

This soil is well suited to local roads and streets. It is limited by low strength. Using a suitable road base material helps to overcome this limitation.

The capability subclass is IIe. The woodland ordination symbol is 8A.

4C—Cecil sandy loam, 7 to 15 percent slopes. This soil is very deep, well drained, and sloping. It formed in residuum derived from acid crystalline rock on upland side slopes in the western part of the county. Individual areas range from about 5 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, dark yellowish brown sandy loam

Subsurface layer:
2 to 9 inches, strong brown sandy loam

Subsoil:
9 to 12 inches, red clay loam
12 to 47 inches, red clay
47 to 55 inches, red clay loam

Substratum:
55 to 72 inches, red sandy clay loam

Included with this soil in mapping are Appling, Helena, Mattaponi, and Roanoke soils. The well drained Appling soils are brownish yellow. They are in landscape positions similar to those of the Cecil soil. The moderately well drained Helena soils are on toe slopes, in saddles, and along drainageways. The moderately well drained Mattaponi soils are in landscape positions similar to those of the Cecil soil. The poorly drained Roanoke soils are in low, flat depressions. Also included are soils that have a thinner solum than the Cecil soil and soils that have a surface layer of clay loam. Included soils make up about 15 percent of the map unit.

Important properties of the Cecil soil—

Permeability: Moderate
Depth to the water table: More than 60 inches
Available water capacity: Moderate
Surface runoff: Rapid
Shrink-swell potential: Low
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid to slightly acid in the surface layer and subsurface layer; very strongly acid in the subsoil and substratum

This soil is used mainly as woodland. Some areas are used for cultivated crops.

This soil is moderately suited to cultivated crops. Crop production is limited by the slope, low fertility, a low content of organic matter, and acidity. Crop yields can be increased by applying lime and fertilizer. The erosion potential is high. A conservation tillage system and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion. Planting cover crops reduces the hazard of wind erosion.

This soil is moderately suited to pasture grasses and legumes. The low fertility, the low content of organic matter, and the acidity are limitations. Using the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and increases the runoff rate and the hazard of erosion. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 110 cubic feet. The soil can be easily managed for timber.

This soil is well suited to building site development. It is limited by the slope. Special architectural design helps to overcome this limitation.

This soil is moderately suited to septic tank absorption fields. It is limited by the moderate permeability and the slope. Increasing the size of the absorption field and placing the field on the contour help to overcome these limitations.

This soil is well suited to local roads and streets. It is limited by low strength and the slope. Using a suitable road base material and using special designs help to overcome these limitations.

The capability subclass is IIIe. The woodland ordination symbol is 8A.

4D—Cecil sandy loam, 15 to 25 percent slopes. This soil is very deep, well drained, and moderately steep. It formed in residuum derived from acid crystalline rock on upland side slopes in the western part of the county. Individual areas range from about 5 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, dark yellowish brown sandy loam

Subsurface layer:
2 to 9 inches, strong brown sandy loam

Subsoil:
9 to 12 inches, red clay loam
12 to 47 inches, red clay
47 to 55 inches, red clay loam

Substratum:
55 to 72 inches, red sandy clay loam

Included with this soil in mapping are Appling, Helena, Mattaponi, and Roanoke soils. The well drained Appling soils are brownish yellow. They are in landscape positions similar to those of the Cecil soil. The moderately well drained Helena soils are on toe slopes, in saddles, and along drainageways. The moderately well drained Mattaponi soils are in landscape positions similar to those of the Cecil soil. The poorly drained Roanoke soils are in low, flat depressions. Also included are soils that have a thinner solum than the Cecil soil and soils that have a surface layer of clay loam. Included soils make up about 15 percent of the map unit.

Important properties of the Cecil soil—

Permeability: Moderate
Depth to the water table: More than 60 inches
Available water capacity: Moderate
Surface runoff: Rapid
Shrink-swell potential: Low
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid to slightly acid in the surface layer and subsurface layer; very strongly acid or strongly acid in the subsoil and substratum

This soil is used mainly as woodland. Some areas are used for cultivated crops.

This soil is poorly suited to cultivated crops. Crop production is limited by the slope, low fertility, a low content of organic matter, and acidity. The erosion potential is high.

This soil is poorly suited to hay and pasture grasses. The low fertility, the slope, the low content of organic matter, and the acidity are limitations. Using the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and increases the runoff rate and the hazard of erosion. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 110 cubic feet. The slope is a limitation affecting the management and harvesting of timber.

This soil is moderately suited to building site development. It is limited by the slope. Special architectural design helps to overcome this limitation.

This soil is moderately suited to septic tank absorption fields. It is limited by the moderate permeability and the slope. Increasing the size of the absorption field and placing the field on the contour help to overcome these limitations.

This soil is well suited to local roads and streets. It is limited by low strength and the slope. Using a suitable road base material and using special designs help to overcome these limitations.

The capability subclass is IVe. The woodland ordination symbol is 8R.

4B3—Cecil clay loam, 2 to 7 percent slopes, severely eroded. This soil is very deep, well drained, and gently sloping. It formed in residuum derived from acid crystalline rock on upland summits and shoulders in the western part of the county. Individual areas range from about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, red clay loam

Subsoil:
6 to 12 inches, red clay loam
12 to 47 inches, red clay
47 to 55 inches, red clay loam

Substratum:
55 to 72 inches, red sandy clay loam

Included with this soil in mapping are Appling, Helena, Mattaponi, and Roanoke soils. The well drained Appling soils are brownish yellow. They are in landscape positions similar to those of the Cecil soil. The moderately well drained Helena soils are on toe slopes, in saddles, and along drainageways. The moderately well drained Mattaponi soils are in landscape positions similar to those of the Cecil soil. The poorly drained Roanoke soils are in low, flat depressions. Also included are soils that have a thinner solum than the Cecil soil and soils that have a surface layer of loam. Included soils make up about 15 percent of the map unit.

Important properties of the Cecil soil—

Permeability: Moderate
Depth to the water table: More than 60 inches
Available water capacity: Moderate
Surface runoff: Medium

Shrink-swell potential: Low
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid to slightly acid in the surface layer; very strongly acid or strongly acid in the subsoil and substratum

This soil is used mainly as woodland or for cultivated crops.

This soil is moderately suited to cultivated crops, especially flue-cured tobacco, corn, and soybeans. Crop production is limited by the clayey surface layer, low fertility, a low content of organic matter, and acidity. Crop yields can be increased by applying lime and fertilizer. Clods can form if the soil is worked at a high moisture content. They result in a poor seedbed. The erosion potential is medium. A conservation tillage system and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion. Planting cover crops reduces the hazard of wind erosion.

This soil is moderately suited to hay and pasture grasses. The low fertility, the low content of organic matter, and the acidity are limitations. Using the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and increases the runoff rate and the hazard of erosion. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 97 cubic feet. The soil can be easily managed for timber.

This soil is well suited to building site development.

This soil is well suited to septic tank absorption fields. Increasing the size of the absorption field helps to overcome the moderate permeability.

This soil is well suited to local roads and streets. It is limited by low strength. Using a suitable road base material helps to overcome this limitation.

The capability subclass is IIIe. The woodland ordination symbol is 7C.

5A—Emporia sandy loam, 0 to 2 percent slopes. This soil is very deep, well drained, and level or nearly level. It formed in loamy fluvial and marine sediments on broad upland flats in the eastern part of the county. Individual areas range from about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches, brown sandy loam

Subsurface layer:
7 to 12 inches, light yellowish brown loam

Subsoil:
12 to 23 inches, light yellowish brown loam
23 to 30 inches, yellowish brown loam that has strong brown mottles
30 to 44 inches, yellowish brown clay loam that has vertical tongues of brown, strong brown, and reddish brown
44 to 53 inches, brown clay loam that has yellowish red mottles and vertical tongues of yellowish brown

Substratum:
53 to 72 inches, mottled brown, yellowish brown, and yellowish red clay loam

Included with this soil in mapping are Mattaponi, Roanoke, Slagle, and Uchee soils. The moderately well drained Mattaponi and well drained Uchee soils are in landscape positions similar to those of the Emporia soil. Uchee soils have a thick, sandy surface layer. The poorly drained Roanoke and moderately well drained Slagle soils are in slight depressions and along drainageways. Included soils make up about 15 percent of the map unit.

Important properties of the Emporia soil—

Permeability: Moderate or moderately slow in the upper part of the subsoil; moderately slow or slow in the lower part
Depth to the water table: 36 to 54 inches
Available water capacity: High
Surface runoff: Slow
Shrink-swell potential: Moderate
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid to moderately acid

This soil is used mainly for cultivated crops. Some areas are used as woodland.

This soil is well suited to cultivated crops, especially peanuts, corn, tobacco, and soybeans. The cation-exchange capacity is low. Surface leaching of nitrogen, sulfates, calcium, magnesium, and potassium occurs, but calcium, magnesium, sulfates, and potassium tend to accumulate in the upper part of the subsoil. Soil tests should include both the surface layer and the upper part of the subsoil for proper interpretation of residual fertility levels. Starter applications of a complete fertilizer are needed, and split applications of nitrogen are recommended. Crop yields can be increased by applying lime and fertilizer. Applications of fertilizer and lime and the seasonal moisture changes produce fluctuations in the amount of available plant nutrients in

the sandy surface layer. Calcium and magnesium levels in the soil fluctuate widely. A yearly or biannual application of small amounts of lime is required. The erosion potential is low. Planting cover crops reduces the hazard of wind erosion and increases the content of organic matter.

This soil is well suited to pasture grasses and legumes. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 100 cubic feet. The soil can be easily managed for timber.

This soil is moderately suited to building site development. It is limited by wetness and the shrink-swell potential. Providing a foundation drainage system and strengthening the foundation help to overcome these limitations.

This soil is poorly suited to septic tank absorption fields. It is limited by the wetness and the slow permeability. Placing the absorption field above the level of the seasonal high water table and increasing the size of the absorption field help to overcome these limitations.

This soil is well suited to local roads and streets. It is limited by low strength. Using a suitable road base material helps to overcome this limitation.

The capability class is I. The woodland ordination symbol is 7A.

5B—Emporia sandy loam, 2 to 6 percent slopes. This soil is very deep, well drained, and gently sloping. It formed in loamy fluvial and marine sediments on upland summits and shoulders in the eastern part of the county. Individual areas range from about 5 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches, brown sandy loam

Subsurface layer:
7 to 12 inches, light yellowish brown loam

Subsoil:
12 to 23 inches, light yellowish brown loam
23 to 30 inches, yellowish brown loam that has strong brown mottles
30 to 44 inches, yellowish brown clay loam that has vertical tongues of brown, strong brown, and reddish brown
44 to 53 inches, brown clay loam that has yellowish red mottles and vertical tongues of yellowish brown

Substratum:
53 to 72 inches, mottled brown, yellowish brown, and yellowish red clay loam

Included with this soil in mapping are Mattaponi, Roanoke, Slagle, and Uchee soils. The moderately well drained Mattaponi and well drained Uchee soils are in landscape positions similar to those of the Emporia soil. Uchee soils have a thick, sandy surface layer. The poorly drained Roanoke and moderately well drained Slagle soils are in slight depressions and along drainageways. Included soils make up about 15 percent of the map unit.

Important properties of the Emporia soil—

Permeability: Moderate or moderately slow in the upper part of the subsoil; moderately slow or slow in the lower part
Depth to the water table: 36 to 54 inches
Available water capacity: High
Surface runoff: Medium
Shrink-swell potential: Moderate
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid to moderately acid

This soil is used mainly for cultivated crops. Some areas are used as woodland.

This soil is well suited to cultivated crops, especially peanuts, corn, tobacco, and soybeans. The cation-exchange capacity is low. Surface leaching of nitrogen, sulfates, calcium, magnesium, and potassium occurs, but calcium, magnesium, sulfates, and potassium tend to accumulate in the upper part of the subsoil. Soil tests should include both the surface layer and the upper part of the subsoil for proper interpretation of residual fertility levels. Starter applications of a complete fertilizer are needed, and split applications of nitrogen are recommended. Crop yields can be increased by applying lime and fertilizer. Applications of fertilizer and lime and the seasonal moisture changes produce fluctuations in the amount of available plant nutrients in the sandy surface layer. Calcium and magnesium levels in the soil fluctuate widely. A yearly or biannual application of small amounts of lime is required. Planting cover crops reduces the hazard of wind erosion and increases the content of organic matter.

This soil is well suited to pasture grasses and legumes. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil

is high. The estimated annual production of wood per acre is 100 cubic feet. The soil can be easily managed for timber.

This soil is moderately suited to building site development. It is limited by wetness and the shrink-swell potential. Providing a foundation drainage system and strengthening the foundation help to overcome these limitations.

This soil is poorly suited to septic tank absorption fields. It is limited by the wetness and the slow permeability. Placing the absorption field above the level of the seasonal high water table and increasing the size of the absorption field help to overcome these limitations.

This soil is well suited to local roads and streets. It is limited by low strength. Using a suitable road base material helps to overcome this limitation.

The capability subclass is IIe. The woodland ordination symbol is 7A.

5C—Emporia sandy loam, 6 to 10 percent slopes. This soil is very deep, well drained, and sloping. It formed in loamy fluvial and marine sediments on upland side slopes in the eastern part of the county. Individual areas range from about 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches, brown sandy loam

Subsurface layer:
7 to 12 inches, light yellowish brown loam

Subsoil:
12 to 23 inches, light yellowish brown loam
23 to 30 inches, yellowish brown loam that has strong brown mottles
30 to 44 inches, yellowish brown clay loam that has vertical tongues of brown, strong brown, and reddish brown
44 to 53 inches, brown clay loam that has yellowish red mottles and vertical tongues of yellowish brown

Substratum:
53 to 72 inches, mottled brown, yellowish brown, and yellowish red clay loam

Included with this soil in mapping are Mattaponi, Roanoke, Slagle, and Uchee soils. The moderately well drained Mattaponi and well drained Uchee soils are in landscape positions similar to those of the Emporia soil. Uchee soils have a thick, sandy surface layer. The poorly drained Roanoke and moderately well drained Slagle soils are in slight depressions and along drainageways. Included soils make up about 15 percent of the map unit.

Important properties of the Emporia soil—

Permeability: Moderate or moderately slow in the upper part of the subsoil; moderately slow or slow in the lower part
Depth to the water table: 36 to 54 inches
Available water capacity: High
Surface runoff: Rapid
Shrink-swell potential: Moderate
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid to moderately acid

This soil is used mainly as woodland.

This soil is moderately suited to cultivated crops. Crop production is limited by low fertility, a low content of organic matter, acidity, and the slope. The erosion potential is high. A conservation tillage system and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

This soil is moderately suited to pasture grasses and legumes. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 100 cubic feet. The soil can be easily managed for timber, although the slope may be a limitation during harvesting.

This soil is moderately suited to building site development. It is limited by wetness, the slope, and the shrink-swell potential. Providing a foundation drainage system, using special architectural design, and strengthening the foundation help to overcome these limitations.

This soil is poorly suited to septic tank absorption fields. It is limited by the wetness, the slow permeability, and the slope. Placing the absorption field above the level of the seasonal high water table, increasing the size of the absorption field, and placing the field on the contour help to overcome these limitations.

This soil is well suited to local roads and streets. It is limited by low strength and the slope. Using a suitable road base material and using special designs help to overcome these limitations.

The capability subclass is IIIe. The woodland ordination symbol is 7A.

6D—Emporia-Slagle complex, 10 to 25 percent slopes. This map unit consists of very deep, well drained and moderately well drained, moderately steep and steep soils. These soils formed in loamy fluvial and

marine sediments on side slopes and foot slopes in the eastern part of the county. The map unit is about 45 percent Emporia soil, 30 percent Slagle soil, and 25 percent other soils. The Emporia and Slagle soils are so intermingled that it is not practical to separate them in mapping. Individual areas range from about 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of the Emporia soil are as follows—

Surface layer:
0 to 7 inches, brown sandy loam

Subsurface layer:
7 to 12 inches, light yellowish brown loam

Subsoil:
12 to 23 inches, light yellowish brown loam
23 to 30 inches, yellowish brown loam that has strong brown mottles
30 to 44 inches, yellowish brown clay loam that has vertical tongues of brown, strong brown, and reddish brown
44 to 53 inches, brown clay loam that has yellowish red mottles and vertical tongues of yellowish brown

Substratum:
53 to 72 inches, mottled brown, yellowish brown, and yellowish red clay loam

The typical sequence, depth, and composition of the layers of the Slagle soil are as follows—

Surface layer:
0 to 4 inches, brown sandy loam

Subsurface layer:
4 to 9 inches, pale brown sandy loam

Subsoil:
9 to 14 inches, light yellowish brown sandy loam
14 to 24 inches, yellowish brown sandy clay loam that has yellowish brown mottles
24 to 30 inches, light olive brown sandy clay loam that has reddish brown and yellowish brown mottles
30 to 44 inches, yellowish brown sandy clay loam that has light brownish gray and yellowish red mottles

Substratum:
44 to 72 inches, mottled yellowish brown, light brownish gray, and yellowish red sandy loam

Included with these soils in mapping are Mattaponi, Roanoke, and Uchee soils. The moderately well drained Mattaponi soils have more clay in the subsoil than the Emporia soil. The well drained Uchee soils have a thick, sandy surface layer. Mattaponi and Uchee soils are on side slopes. The poorly drained Roanoke soils are in slight depressions and along drainageways. Included soils make up about 15 percent of the map unit.

Important properties of the Emporia soil—

Permeability: Moderate or moderately slow in the upper part of the subsoil; moderately slow or slow in the lower part
Depth to the water table: 36 to 54 inches
Available water capacity: High
Surface runoff: Rapid
Shrink-swell potential: Moderate
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid to moderately acid

Important properties of the Slagle soil—

Permeability: Moderate or moderately slow in the subsoil; moderately slow to moderately rapid in the substratum
Depth to the water table: 18 to 36 inches
Available water capacity: High
Surface runoff: Rapid
Shrink-swell potential: Moderate
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Extremely acid to strongly acid

This map unit is used mainly as woodland.

This map unit is poorly suited to cultivated crops. Crop production is limited by low fertility, a low content of organic matter, acidity, and the slope. The erosion potential is high. A conservation tillage system and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

This map unit is poorly suited to pasture grasses and legumes. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine in areas of this map unit is high. The estimated annual production of wood per acre is 100 cubic feet. The soils can be easily managed for timber, although the slope may be a limitation during harvesting.

This map unit is moderately suited to building site development. The Emporia soil is limited by wetness, the slope, and the shrink-swell potential. The Slagle soil is limited by the wetness and the slope. Providing a foundation drainage system, using special architectural design, and strengthening the foundation help to overcome these limitations.

This map unit is poorly suited to septic tank absorption fields. It is limited by the wetness, the

restricted permeability, and the slope. Placing the absorption field above the level of the seasonal high water table, increasing the size of the absorption field, and placing the field on the contour help to overcome these limitations.

This map unit is moderately suited to local roads and streets. The Emporia soil is limited by low strength and the slope. The Slagle soil is limited by low strength, the wetness, and the slope. Using a suitable road base material and using special designs help to overcome these limitations.

The capability subclass is IVe. The woodland ordination symbol is 7R for the Emporia soil and 9R for the Slagle soil.

7B—Emporia-Urban land complex, 0 to 6 percent slopes. This map unit consists of a very deep, well drained, nearly level or gently sloping soil and areas of Urban land. It is on upland summits and shoulders in the eastern part of the county. It is about 40 percent Emporia soil, 40 percent Urban land, and 20 percent other soils. Individual areas range from about 5 to 200 acres in size. The Emporia soil and the areas of Urban land are so intermingled that it is not practical to map them separately.

The typical sequence, depth, and composition of the layers of the Emporia soil are as follows—

Surface layer:
0 to 7 inches, brown sandy loam

Subsurface layer:
7 to 12 inches, light yellowish brown loam

Subsoil:
12 to 23 inches, light yellowish brown loam
23 to 30 inches, yellowish brown loam that has strong brown mottles
30 to 44 inches, yellowish brown clay loam that has vertical tongues of brown, strong brown, and reddish brown
44 to 53 inches, brown clay loam that has yellowish red mottles and vertical tongues of yellowish brown

Substratum:
53 to 72 inches, mottled brown, yellowish brown, and yellowish red clay loam

The Urban land consists of asphalt, concrete, buildings, or other impervious surfaces.

Included in mapping are Mattaponi, Roanoke, Slagle, and Uchee soils. The moderately well drained Mattaponi soils have more clay in the subsoil than the Emporia soil. The well drained Uchee soils have a thick, sandy surface layer. Mattaponi and Uchee soils are in landscape positions similar to those of the Emporia soil. The poorly drained Roanoke and moderately well drained Slagle soils are in slight depressions and along drainageways. Included soils make up about 15 percent of the map unit.

Important properties of the Emporia soil—

Permeability: Moderate or moderately slow in the upper part of the subsoil; moderately slow or slow in the lower part
Depth to the water table: 36 to 54 inches
Available water capacity: High
Surface runoff: Medium
Shrink-swell potential: Moderate
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid to moderately acid

This map unit is used mainly for urban development. It is not suited to crops, pasture grasses and legumes, or woodland.

This map unit is moderately suited to building site development. The Emporia soil is limited by wetness and the shrink-swell potential. Providing a foundation drainage system and strengthening the foundation help to overcome these limitations.

This map unit is serviced by community sewer systems in most areas. The Emporia soil is poorly suited to septic tank absorption fields. It is limited by the wetness and the slow permeability. Placing the absorption field above the level of the seasonal high water table and increasing the size of the absorption field help to overcome these limitations.

This map unit is well suited to local roads and streets. The Emporia soil is limited by low strength. Using a suitable road base material helps to overcome this limitation.

No capability subclass is assigned. The woodland ordination symbol for the Emporia soil is 7A.

8B—Georgeville silt loam, 2 to 7 percent slopes. This soil is very deep, well drained, and gently sloping. It formed in residuum derived from fine grained rock, such as Carolina slate, on upland summits and shoulders in the western part of the county. Individual areas range from about 5 to 80 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, dark brown silt loam

Subsoil:
4 to 8 inches, red silty clay loam
8 to 21 inches, red clay

21 to 51 inches, red silty clay
51 to 75 inches, red silty clay loam

Included with this soil in mapping are Helena, Herndon, Iredell, Mattaponi, and Roanoke soils. The moderately well drained Helena and Iredell soils are on toe slopes, in saddles, and along drainageways. The well drained Herndon and moderately well drained Mattaponi soils are in landscape positions similar to those of the Georgeville soil. Herndon soils are strong brown. The poorly drained Roanoke soils are in low, flat depressions. Also included are soils that have a surface layer of clay loam. Included soils make up about 15 percent of the map unit.

Important properties of the Georgeville soil—

Permeability: Moderate
Depth to the water table: More than 60 inches
Available water capacity: High
Surface runoff: Medium
Shrink-swell potential: Low
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid to moderately acid in the surface layer; very strongly acid or strongly acid in the rest of the profile

This soil is used mainly as woodland. Some areas are used for cultivated crops.

This soil is well suited to cultivated crops, such as small grain, soybeans, and corn. The infiltration rate is slow because of the poor physical condition of the soil and a low content of organic matter. The growth of plant roots may be limited by the high content of exchangeable aluminum. Crop yields can be increased by applying lime and fertilizer. The cation-exchange capacity is low, and crops require a starter application of a complete fertilizer. Applications of lime are needed for most commonly grown crops. The erosion potential is medium. Conservation tillage and conservation cropping systems that include grasses and legumes improve tilth, reduce the runoff rate, and help to control erosion.

This soil is well suited to pasture grasses and legumes. Low fertility, the low content of organic matter, and acidity are limitations. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 110 cubic feet. The soil can be easily managed for timber.

This soil is well suited to building site development.

This soil is well suited to septic tank absorption fields. Increasing the size of the absorption field helps to overcome the moderate permeability.

This soil is well suited to local roads and streets. It is limited by low strength. Using a suitable road base material helps to overcome this limitation.

The capability subclass is IIe. The woodland ordination symbol is 8A.

8C—Georgeville silt loam, 7 to 15 percent slopes. This soil is very deep, well drained, and sloping. It formed in residuum derived from fine grained rock, such as Carolina slate, on upland side slopes in the western part of the county. Individual areas range from about 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, dark brown silt loam

Subsoil:
4 to 8 inches, red silty clay loam
8 to 21 inches, red clay
21 to 51 inches, red silty clay
51 to 75 inches, red silty clay loam

Included with this soil in mapping are Helena, Herndon, Iredell, Mattaponi, and Roanoke soils. The moderately well drained Helena and Iredell soils are on toe slopes, in saddles, and along drainageways. The well drained Herndon and moderately well drained Mattaponi soils are in landscape positions similar to those of the Georgeville soil. Herndon soils are strong brown. The poorly drained Roanoke soils are in low, flat depressions. Also included are soils that have a surface layer of clay loam. Included soils make up about 15 percent of the map unit.

Important properties of the Georgeville soil—

Permeability: Moderate
Depth to the water table: More than 60 inches
Available water capacity: High
Surface runoff: Medium
Shrink-swell potential: Low
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid to moderately acid in the surface layer; very strongly acid or strongly acid in the rest of the profile

This soil is used mainly as woodland. Some areas are used for cultivated crops.

This soil is moderately suited to cultivated crops, such as small grain, soybeans, and corn. The infiltration rate is slow because of the poor physical condition of

the soil and a low content of organic matter. The growth of plant roots may be limited by the high content of exchangeable aluminum. Crop yields can be increased by applying lime and fertilizer. The cation-exchange capacity is low, and crops require a starter application of a complete fertilizer. Applications of lime are needed for most commonly grown crops. The erosion potential is high. Conservation tillage and conservation cropping systems that include grasses and legumes improve tilth, reduce the runoff rate, and help to control erosion.

This soil is moderately suited to pasture grasses and legumes. Low fertility, the low content of organic matter, and acidity are limitations. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 110 cubic feet. The soil can be easily managed for timber.

This soil is well suited to building site development. It is limited by the slope. Special architectural design helps to overcome this limitation.

This soil is moderately suited to septic tank absorption fields. It is limited by the moderate permeability and the slope. Increasing the size of the absorption field and placing the field on the contour help to overcome these limitations.

This soil is well suited to local roads and streets. It is limited by low strength and the slope. Using a suitable road base material and using special designs help to overcome these limitations.

The capability subclass is IIIe. The woodland ordination symbol is 8A.

8D—Georgeville silt loam, 15 to 25 percent slopes. This soil is very deep, well drained, and moderately steep. It formed in residuum derived from fine grained rock, such as Carolina slate, on upland side slopes in the western part of the county. Individual areas range from about 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, dark brown silt loam

Subsoil:
4 to 8 inches, red silty clay loam
8 to 21 inches, red clay
21 to 51 inches, red silty clay
51 to 75 inches, red silty clay loam

Included with this soil in mapping are Helena, Herndon, Iredell, Mattaponi, and Roanoke soils. The moderately well drained Helena and Iredell soils are on toe slopes, in saddles, and along drainageways. The well drained Herndon and moderately well drained Mattaponi soils are in landscape positions similar to those of the Georgeville soil. Herndon soils are strong brown. The poorly drained Roanoke soils are in low, flat depressions. Also included are soils that have a surface layer of clay loam. Included soils make up about 15 percent of the map unit.

Important properties of the Georgeville soil—

Permeability: Moderate
Depth to the water table: More than 60 inches
Available water capacity: High
Surface runoff: Rapid
Shrink-swell potential: Low
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid to moderately acid in the surface layer; very strongly acid or strongly acid in the rest of the profile

This soil is used mainly as woodland. Some areas are used for cultivated crops.

This soil is poorly suited to cultivated crops because of the high erosion potential.

This soil is poorly suited to pasture grasses and legumes. Low fertility, the slope, a low content of organic matter, and acidity are limitations. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 110 cubic feet. The slope is a limitation affecting the management and harvesting of timber.

This soil is moderately suited to building site development. It is limited by the slope. Special architectural design helps to overcome this limitation.

This soil is moderately suited to septic tank absorption fields. It is limited by the moderate permeability and the slope. Increasing the size of the absorption field and placing the field on the contour help to overcome these limitations.

This soil is well suited to local roads and streets. It is limited by low strength and the slope. Using a suitable road base material and using special designs help to overcome these limitations.

The capability subclass is IVe. The woodland ordination symbol is 8R.

8B3—Georgeville clay loam, 2 to 7 percent slopes, severely eroded. This soil is very deep, well drained, and gently sloping. It formed in residuum derived from fine grained rock, such as Carolina slate, on upland summits and shoulders in the western part of the county. Individual areas range from about 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, red clay loam

Subsoil:
6 to 21 inches, red clay
21 to 51 inches, red silty clay
51 to 75 inches, red silty clay loam

Included with this soil in mapping are Helena, Herndon, Iredell, Mattaponi, and Roanoke soils. The moderately well drained Helena and Iredell soils are on toe slopes, in saddles, and along drainageways. The well drained Herndon and moderately well drained Mattaponi soils are in landscape positions similar to those of the Georgeville soil. Herndon soils are strong brown. The poorly drained Roanoke soils are in depressions. Also included are soils that have a surface layer of silt loam. Included soils make up about 15 percent of the map unit.

Important properties of the Georgeville soil—

Permeability: Moderate
Depth to the water table: More than 60 inches
Available water capacity: High
Surface runoff: Medium
Shrink-swell potential: Low
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid to moderately acid in the surface layer; very strongly acid or strongly acid in the rest of the profile

This soil is used mainly as woodland. Some areas are used for cultivated crops.

This soil is moderately suited to cultivated crops, such as small grain, soybeans, and corn. The infiltration rate is slow because of the poor physical condition of the soil and a low content of organic matter. The growth of plant roots may be limited by the high content of exchangeable aluminum. Crop yields can be increased by applying lime and fertilizer. The cation-exchange capacity is low, and crops require a starter application of a complete fertilizer. Applications of lime are needed for most commonly grown crops. Clods can form if the soil is worked at a high moisture content. They result in a poor seedbed. The erosion potential is high. Conservation tillage and conservation cropping systems that include grasses and legumes improve tilth, reduce the runoff rate, and help to control erosion.

This soil is moderately suited to pasture grasses and legumes. The clay loam surface layer is a limitation. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 110 cubic feet. The soil can be easily managed for timber.

This soil is well suited to building site development.

This soil is well suited to septic tank absorption fields. Increasing the size of the absorption field helps to overcome the moderate permeability.

This soil is well suited to local roads and streets. It is limited by low strength. Using a suitable road base material helps to overcome this limitation.

The capability subclass is IIIe. The woodland ordination symbol is 6C.

8C3—Georgeville clay loam, 7 to 15 percent slopes, severely eroded. This soil is very deep, well drained, and sloping. It formed in residuum derived from fine grained rock, such as Carolina slate, on upland side slopes in the western part of the county. Individual areas range from about 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, red clay loam

Subsoil:
6 to 21 inches, red clay
21 to 51 inches, red silty clay
51 to 75 inches, red silty clay loam

Included with this soil in mapping are Helena, Herndon, Iredell, Mattaponi, and Roanoke soils. The moderately well drained Helena and Iredell soils are on toe slopes, in saddles, and along drainageways. The well drained Herndon and moderately well drained Mattaponi soils are in landscape positions similar to those of the Georgeville soil. Herndon soils are strong brown. The poorly drained Roanoke soils are in low, flat depressions. Also included are soils that have a surface layer of silt loam. Included soils make up about 15 percent of the map unit.

Important properties of the Georgeville soil—

Permeability: Moderate
Depth to the water table: More than 60 inches

Available water capacity: High
Surface runoff: Medium
Shrink-swell potential: Low
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid to moderately acid in the surface layer; very strongly acid or strongly acid in the rest of the profile

This soil is used mainly as woodland. Some areas are used for cultivated crops.

This soil is poorly suited to cultivated crops. The infiltration rate is slow because of the poor physical condition of the soil and a low content of organic matter. The growth of plant roots may be limited by a high content of exchangeable aluminum. Crop yields can be increased by applying lime and fertilizer. The cation-exchange capacity is low, and crops require a starter application of a complete fertilizer. Applications of lime are needed for most commonly grown crops. Clods can form if the soil is worked at a high moisture content. They result in a poor seedbed. The erosion potential is high. Conservation tillage and conservation cropping systems that include grasses and legumes improve tilth, reduce the runoff rate, and help to control erosion.

This soil is poorly suited to pasture grasses and legumes. The clay loam surface layer is a limitation. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 110 cubic feet. The soil can be easily managed for timber.

This soil is well suited to building site development. It is limited by the slope. Special architectural design helps to overcome this limitation.

This soil is moderately suited to septic tank absorption fields. It is limited by the moderate permeability and the slope. Increasing the size of the absorption field and placing the field on the contour help to overcome these limitations.

This soil is well suited to local roads and streets. It is limited by low strength and the slope. Using a suitable road base material and using special designs help to overcome these limitations.

The capability subclass is IVe. The woodland ordination symbol is 6C.

9B—Helena loam, 2 to 7 percent slopes. This soil is very deep, moderately well drained, and gently sloping. It formed in residuum derived from acid crystalline rock on upland toe slopes and saddles and in drainageways in the western part of the county. Individual areas range from about 3 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, grayish brown loam

Subsurface layer:
2 to 7 inches, pale brown loam

Subsoil:
7 to 16 inches, brownish yellow sandy clay loam that has strong brown mottles
16 to 21 inches, pale brown clay loam that has yellowish brown mottles
21 to 32 inches, yellowish brown clay that has gray mottles
32 to 43 inches, brownish yellow clay that has gray and reddish yellow mottles
43 to 55 inches, very pale brown clay loam that has strong brown mottles

Substratum:
55 to 72 inches, light gray clay loam saprolite that has brownish yellow mottles

Included with this soil in mapping are Appling, Herndon, Iredell, and Roanoke soils. The well drained Appling and Herndon soils are on summits, shoulders, and side slopes. The moderately well drained Iredell soils are in landscape positions similar to those of the Helena soil. The poorly drained Roanoke soils are in low, flat depressions. Included soils make up about 15 percent of the map unit.

Important properties of the Helena soil—

Permeability: Slow
Depth to the water table: 18 to 30 inches
Available water capacity: Moderate
Surface runoff: Medium
Shrink-swell potential: High
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsurface layer; very strongly acid or strongly acid in the subsoil and substratum

This soil is used mainly as woodland. Some areas are used for cultivated crops.

This soil is well suited to cultivated crops, especially soybeans, tobacco, small grain, and corn. Crop production is limited by wetness, low fertility, a low content of organic matter, and acidity. Small grain tends to become lodged. Because the plow layer holds only limited amounts of moisture, plant nutrients are leached

from the surface. The root zone is limited because of the clayey subsoil and moderate exchangeable aluminum. The soil is moderately droughty. Crop yields can be increased by applying lime and fertilizer. The cation-exchange capacity is low, and starter applications of complete plant nutrients are needed. Plant nutrients, such as sulfates, calcium, magnesium, and potassium, tend to accumulate in the upper part of the subsoil. Soil tests should include both the surface layer and the subsoil for proper interpretation of residual fertility levels. Applications of lime are needed for most crops. Side dressings of nitrogen are needed for those crops that require nitrogen. The erosion potential is medium. Conservation tillage and conservation cropping systems that include grasses and legumes help to control runoff and erosion.

This soil is well suited to pasture grasses and legumes. The restricted root zone and the wetness are limitations. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 110 cubic feet. The soil can be easily managed for timber. The wetness and low strength limit the use of harvesting equipment.

This soil is poorly suited to building site development. It is limited by the wetness and the shrink-swell potential. Providing a foundation drainage system and strengthening the foundation help to overcome these limitations.

This soil is poorly suited to septic tank absorption fields. It is limited by the wetness and the slow permeability. Placing the absorption field above the level of the seasonal high water table and increasing the size of the absorption field help to overcome these limitations.

This soil is poorly suited to local roads and streets. It is limited by the low strength and the shrink-swell potential. Using a suitable road base material helps to overcome these limitations.

The capability subclass is IIe. The woodland ordination symbol is 8A.

9C—Helena loam, 7 to 15 percent slopes. This soil is very deep, moderately well drained, and sloping. It formed in residuum derived from acid crystalline rock on upland toe slopes and saddles and in drainageways in the western part of the county. Individual areas range from about 3 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, grayish brown loam

Subsurface layer:
2 to 7 inches, pale brown loam

Subsoil:
7 to 16 inches, brownish yellow sandy clay loam that has strong brown mottles
16 to 21 inches, pale brown clay loam that has yellowish brown mottles
21 to 32 inches, yellowish brown clay that has gray mottles
32 to 43 inches, brownish yellow clay that has gray and reddish yellow mottles
43 to 55 inches, very pale brown clay loam that has strong brown mottles

Substratum:
55 to 72 inches, light gray clay loam saprolite that has brownish yellow mottles

Included with this soil in mapping are Appling, Herndon, Iredell, and Roanoke soils. The well drained Appling and Herndon soils are on upland summits, shoulders, and side slopes. The moderately well drained Iredell soils are in landscape positions similar to those of the Helena soil. The poorly drained Roanoke soils are in low, flat depressions. Included soils make up about 15 percent of the map unit.

Important properties of the Helena soil—

Permeability: Slow
Depth to the water table: 18 to 30 inches
Available water capacity: Moderate
Surface runoff: Rapid
Shrink-swell potential: High
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsurface layer; very strongly acid or strongly acid in the subsoil and substratum

This soil is used mainly as woodland. Some areas are used for cultivated crops.

This soil is moderately suited to cultivated crops, especially soybeans, tobacco, small grain, and corn. Because the plow layer holds only limited amounts of moisture, plant nutrients are leached from the surface. The root zone is limited because of the clayey subsoil and moderate exchangeable aluminum. The soil is moderately droughty. Crop yields can be increased by applying lime and fertilizer. The cation-exchange capacity is low, and starter applications of complete plant nutrients are needed. Plant nutrients, such as sulfates, calcium, magnesium, and potassium, tend to

accumulate in the upper part of the subsoil. Soil tests should include both the surface layer and the subsoil for proper interpretation of residual fertility levels. Applications of lime are needed for most crops. Side dressings of nitrogen are needed for those crops that require nitrogen. The erosion potential is high. Conservation tillage and conservation cropping systems that include grasses and legumes help to control runoff and erosion.

This soil is moderately suited to pasture grasses and legumes. The restricted root zone and wetness are limitations. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 110 cubic feet. The wetness and low strength limit the use of harvesting equipment.

This soil is poorly suited to building site development. It is limited by the wetness, the slope, and the shrink-swell potential. Providing a foundation drainage system, using special architectural design, and strengthening the foundation help to overcome these limitations.

This soil is poorly suited to septic tank absorption fields. It is limited by the wetness, the slow permeability, and the slope. Placing the absorption field above the level of the seasonal high water table, increasing the size of the absorption field, and placing the field on the contour help to overcome these limitations.

This soil is poorly suited to local roads and streets. It is limited by the low strength, the shrink-swell potential, and the slope. Using a suitable road base material and using special designs help to overcome these limitations.

The capability subclass is IIIe. The woodland ordination symbol is 8A.

10B—Herndon loam, 2 to 7 percent slopes. This soil is very deep, well drained, and gently sloping. It formed in residuum derived from fine grained rock, such as Carolina slate, on upland summits and shoulders in the western part of the county. Individual areas range from about 5 to 80 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, very dark grayish brown loam

Subsurface layer:
3 to 12 inches, brownish yellow loam

Subsoil:
12 to 21 inches, yellowish brown silty clay loam
21 to 30 inches, strong brown silty clay loam that has yellowish red mottles
30 to 38 inches, strong brown silty clay loam that has red mottles
38 to 47 inches, reddish yellow silty clay loam that has red, strong brown, and very pale brown mottles

Substratum:
47 to 72 inches, red, strong brown, and white silt loam saprolite

Included with this soil in mapping are Georgeville, Helena, Iredell, and Roanoke soils. The well drained Georgeville soils are red. They are in landscape positions similar to those of the Herndon soil. The moderately well drained Helena and Iredell soils are on toe slopes, in saddles, and along drainageways. The poorly drained Roanoke soils are in low, flat depressions. Included soils make up about 15 percent of the map unit.

Important properties of the Herndon soil—

Permeability: Moderate
Depth to the water table: More than 60 inches
Available water capacity: High
Surface runoff: Medium
Shrink-swell potential: Low
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid to slightly acid in the surface layer and subsurface layer; extremely acid to strongly acid in the subsoil and substratum

This soil is used mainly as woodland or for cultivated crops.

This soil is well suited to cultivated crops, especially small grain, corn, and soybeans. Crop production is limited by low fertility, a low content of organic matter, and acidity. The growth of some plants is limited by a high content of exchangeable aluminum in the soil. Lime is needed in most areas to offset the acidity and the high exchangeable aluminum. Additions of fertilizer are needed. Small grain tends to become lodged. The erosion potential is medium. A conservation tillage system and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

This soil is well suited to pasture grasses and legumes. The low fertility, the low content of organic matter, and the acidity are limitations. A wide variety of grasses and legumes are adapted to this soil if appropriate amounts of lime and fertilizer are added. Using the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and increases the runoff rate and the hazard of erosion.

Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 110 cubic feet. The soil can be easily managed for timber.

This soil is well suited to building site development.

This soil is well suited to septic tank absorption fields. Increasing the size of the absorption field helps to overcome the moderate permeability.

This soil is well suited to local roads and streets. It is limited by low strength. Using a suitable road base material helps to overcome this limitation.

The capability subclass is IIe. The woodland ordination symbol is 8A.

10C—Herndon loam, 7 to 15 percent slopes. This soil is very deep, well drained, and sloping. It formed in residuum derived from fine grained rock, such as Carolina slate, on upland side slopes in the western part of the county. Individual areas range from about 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, very dark grayish brown loam

Subsurface layer:
3 to 12 inches, brownish yellow loam

Subsoil:
12 to 21 inches, yellowish brown silty clay loam
21 to 30 inches, strong brown silty clay loam that has yellowish red mottles
30 to 38 inches, strong brown silty clay loam that has red mottles
38 to 47 inches, reddish yellow silty clay loam that has red, strong brown, and very pale brown mottles

Substratum:
47 to 72 inches, red, strong brown, and white silt loam saprolite

Included with this soil in mapping are Georgeville, Helena, Iredell, and Roanoke soils. The well drained Georgeville soils are red. They are in landscape positions similar to those of the Herndon soil. The moderately well drained Helena and Iredell soils are on toe slopes, in saddles, and along drainageways. The poorly drained Roanoke soils are in low, flat depressions. Included soils make up about 15 percent of the map unit.

Important properties of the Herndon soil—

Permeability: Moderate
Depth to the water table: More than 60 inches
Available water capacity: High
Surface runoff: Medium
Shrink-swell potential: Low
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid to slightly acid in the surface layer and subsurface layer; extremely acid to strongly acid in the subsoil and substratum

This soil is used mainly as woodland or for cultivated crops.

This soil is moderately suited to cultivated crops, especially small grain, corn, and soybeans. Crop production is limited by the slope, low fertility, a low content of organic matter, and acidity. The growth of some plants is limited by a high content of exchangeable aluminum in the soil. Lime is needed in most areas to offset the acidity and the high exchangeable aluminum. Additions of fertilizer are needed. Small grain tends to become lodged. The erosion potential is high. A conservation tillage system and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion.

This soil is moderately suited to pasture grasses and hay. The low fertility, the low content of organic matter, and the acidity are limitations. A wide variety of grasses and legumes are adapted to this soil if appropriate amounts of lime and fertilizer are added. Using the soil for pasture and hay helps to control erosion, but overgrazing compacts the surface layer and increases the runoff rate and the hazard of erosion. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 110 cubic feet. The soil can be easily managed for timber.

This soil is well suited to building site development. It is limited by the slope. Special architectural design helps to overcome this limitation.

This soil is moderately suited to septic tank absorption fields. It is limited by the moderate permeability and the slope. Increasing the size of the absorption field and placing the field on the contour help to overcome these limitations.

This soil is well suited to local roads and streets. It is limited by low strength and the slope. Using a suitable

road base material and using special designs help to overcome these limitations.

The capability subclass is IIIe. The woodland ordination symbol is 8A.

11B—Iredell loam, 2 to 7 percent slopes. This soil is very deep, moderately well drained, and gently sloping. It formed in residuum derived from basic crystalline rock on upland toe slopes and saddles and in drainageways in the western part of the county. Individual areas range from about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, grayish brown loam

Subsurface layer:
4 to 10 inches, light brownish gray loam

Subsoil:
10 to 26 inches, yellowish brown clay

Substratum:
26 to 30 inches, brownish yellow loam that has dark yellowish brown and strong brown mottles
30 to 38 inches, finely mottled dark greenish gray, very pale brown, and yellowish brown loam saprolite
38 to 72 inches, finely mottled dark greenish gray, very pale brown, black, and yellowish brown sandy loam saprolite

Included with this soil in mapping are Georgeville, Helena, Herndon, and Roanoke soils. The well drained Georgeville and Herndon soils are on summits, shoulders, and side slopes. The moderately well drained Helena soils have lower base saturation than the Iredell soil. They are on toe slopes, in saddles, and along drainageways. The poorly drained Roanoke soils are in low, flat depressions. Also included are soils that have a surface layer of clay loam and clay. Included soils make up about 15 percent of the map unit.

Important properties of the Iredell soil—

Permeability: Slow
Depth to the water table: 12 to 24 inches
Available water capacity: High
Surface runoff: Medium
Shrink-swell potential: Very high
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Strongly acid to neutral in the surface layer and subsurface layer; moderately acid to neutral in the subsoil; neutral or mildly alkaline in the substratum

This soil is used mainly as woodland.

This soil is poorly suited to cultivated crops. It dries slowly after extended wet periods, and denitrification may occur. Split applications of nitrogen are beneficial to most crops. The amount of available phosphorus is very low, and the amount of available potassium is low. Calcium and magnesium levels are adequate for most crops. Starter applications of a complete fertilizer are recommended because the levels of plant nutrients are low in the surface layer. Leaching of nutrients from the surface layer may cause a concentration of plant nutrients in the upper part of the subsoil. The erosion potential is medium. If this soil is cultivated, conservation tillage and conservation cropping systems that include grasses and legumes improve tilth, reduce the runoff rate, and help to control erosion. Small grain tends to become lodged.

This soil is moderately suited to pasture grasses and legumes. Wetness is a limitation. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 90 cubic feet. The soil is suited to timber production. Management concerns include an equipment limitation and a moderate seedling mortality rate caused by the shrink-swell potential and the wetness.

This soil is poorly suited to building site development. It is limited by the wetness and the shrink-swell potential. Providing a foundation drainage system and strengthening the foundation help to overcome these limitations.

This soil is poorly suited to septic tank absorption fields. It is limited by the wetness and the slow permeability. Placing the absorption field above the level of the seasonal high water table and increasing the size of the absorption field help to overcome these limitations.

The capability subclass is IIe. The woodland ordination symbol is 6C.

11C—Iredell loam, 7 to 15 percent slopes. This soil is very deep, moderately well drained, and sloping. It formed in residuum derived from basic crystalline rock on upland side slopes in the western part of the county. Individual areas range from about 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, grayish brown loam

Subsurface layer:
4 to 10 inches, light brownish gray loam

Subsoil:
10 to 26 inches, yellowish brown clay

Substratum:
26 to 30 inches, brownish yellow loam that has dark yellowish brown and strong brown mottles
30 to 38 inches, finely mottled dark greenish gray, very pale brown, and yellowish brown loam saprolite
38 to 72 inches, finely mottled dark greenish gray, very pale brown, black, and yellowish brown sandy loam saprolite

Included with this soil in mapping are Georgeville, Helena, Herndon, and Roanoke soils. The well drained Georgeville and Herndon soils are in landscape positions similar to those of the Iredell soil. The moderately well drained Helena soils have lower base saturation than the Iredell soil. They are on toe slopes, in saddles, and along drainageways. The poorly drained Roanoke soils are in low, flat depressions. Also included are soils that have a surface layer of clay loam and clay. Included soils make up about 15 percent of the map unit.

Important properties of the Iredell soil—

Permeability: Slow
Depth to the water table: 12 to 24 inches
Available water capacity: High
Surface runoff: Medium
Shrink-swell potential: Very high
Rooting depth: More than 40 inches
Depth to bedrock: More than 60 inches
Soil reaction: Strongly acid to neutral in the surface layer and subsurface layer; moderately acid to neutral in the subsoil; neutral or mildly alkaline in the substratum

This soil is used mainly as woodland.

This soil is poorly suited to cultivated crops. The subsoil is clayey, and the shrink-swell potential is very high. The amount of available phosphorus is very low, and the amount of available potassium is low. Calcium and magnesium levels are adequate for most crops. Small grain and grass-clover mixtures are recommended for planting. Additions of trace elements may be needed. The addition of nitrogen is needed to establish small grain and grass-clover mixtures. The erosion potential is high.

This soil is moderately suited to pasture grasses and legumes. Wetness is a limitation. If this soil is used for pasture, good management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 90 cubic feet. The soil is suited to timber production. Management concerns include an equipment limitation and a moderate seedling mortality rate caused by the wetness and the shrink-swell potential.

This soil is poorly suited to building site development. It is limited by the wetness, the slope, and the shrink-swell potential. Providing a foundation drainage system, using special architectural design, and strengthening the foundation help to overcome these limitations.

This soil is poorly suited to septic tank absorption fields. It is limited by the wetness, the slow permeability, and the slope. Placing the absorption field above the level of the seasonal high water table, increasing the size of the absorption field, and placing the field on the contour help to overcome these limitations.

This soil is poorly suited to local roads and streets. It is limited by low strength, the shrink-swell potential, and the slope. Using a suitable road base material and using special designs help to overcome these limitations.

The capability subclass is IIIe. The woodland ordination symbol is 6C.

12A—Mattaponi sandy loam, 0 to 2 percent slopes. This soil is very deep, moderately well drained, and level or nearly level. It formed in loamy and clayey fluvial and marine sediments on broad upland flats in the eastern part of the county. Individual areas range from about 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown sandy loam

Subsurface layer:
2 to 13 inches, yellowish brown sandy loam

Subsoil:
13 to 19 inches, strong brown clay loam
19 to 29 inches, strong brown clay
29 to 37 inches, strong brown clay that has brownish yellow and red mottles
37 to 46 inches, strong brown clay
46 to 72 inches, mottled strong brown, brownish yellow, reddish yellow, and very pale brown clay

Included with this soil in mapping are Emporia, Roanoke, and Slagle soils. The well drained Emporia soils have less clay in the subsoil than the Mattaponi soil. They are in landscape positions similar to those of

the Mattaponi soil. The poorly drained Roanoke soils are in depressions and drainageways. The moderately well drained Slagle soils have less clay in the subsoil than the Mattaponi soil. They are in depressions and drainageways. Included soils make up about 15 percent of the map unit.

Important properties of the Mattaponi soil—

Permeability: Moderately slow
Depth to the water table: 36 to 72 inches
Available water capacity: High
Surface runoff: Slow
Shrink-swell potential: Moderate
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid or strongly acid

This soil is used mainly for cultivated crops. Some areas are used as woodland.

This soil is well suited to cultivated crops, especially soybeans, tobacco, small grain, and corn. Crop yields can be increased by applying lime and fertilizer. The cation-exchange capacity is low, and starter applications of complete plant nutrients are needed. Plant nutrients, such as sulfates, calcium, magnesium, and potassium, tend to accumulate in the upper part of the subsoil. Soil tests should include both the surface layer and the subsoil for proper interpretation of residual fertility levels. Applications of lime are needed for most crops. Side dressings of nitrogen are needed for those crops that require nitrogen. Tile drainage does not effectively reduce the wetness. Small grain tends to become lodged. The erosion potential is low.

This soil is well suited to pasture grasses and legumes. Low fertility, acidity, and restricted root growth are limitations. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 110 cubic feet. The soil can be easily managed for timber.

This soil is moderately suited to building site development. It is limited by the wetness and the shrink-swell potential. Providing a foundation drainage system and strengthening the foundation help to overcome these limitations.

This soil is poorly suited to septic tank absorption fields. It is limited by the wetness and the slow permeability. Placing the absorption field above the level of the seasonal high water table and increasing the size of the absorption field help to overcome these limitations.

This soil is moderately suited to local roads and streets. It is limited by low strength. Using a suitable road base material helps to overcome this limitation.

The capability subclass is IIw. The woodland ordination symbol is 8A.

12B—Mattaponi sandy loam, 2 to 6 percent slopes. This soil is very deep, moderately well drained, and gently sloping. It formed in loamy and clayey fluvial and marine sediments on broad upland summits and shoulders throughout the county. Individual areas range from about 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown sandy loam

Subsurface layer:
2 to 13 inches, yellowish brown sandy loam

Subsoil:
13 to 19 inches, strong brown clay loam
19 to 29 inches, strong brown clay
29 to 37 inches, strong brown clay that has brownish yellow and red mottles
37 to 46 inches, strong brown clay
46 to 72 inches, mottled strong brown, brownish yellow, reddish yellow, and very pale brown clay

Included with this soil in mapping in areas of the Coastal Plain are Emporia, Roanoke, and Slagle soils. The well drained Emporia soils are in landscape positions similar to those of the Mattaponi soil. The poorly drained Roanoke soils are in depressions and drainageways. The moderately well drained Slagle soils have less clay in the subsoil than the Mattaponi soil. They are in depressions and drainageways. Included in mapping in the Piedmont area are Appling, Cecil, Georgeville, and Herndon soils. The well drained Appling, Cecil, Georgeville, and Herndon soils are in landscape positions similar to those of the Mattaponi soil. Included soils make up about 15 percent of the map unit.

Important properties of the Mattaponi soil—

Permeability: Moderately slow
Depth to the water table: 36 to 72 inches
Available water capacity: High
Surface runoff: Medium
Shrink-swell potential: Moderate
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid or strongly acid

This soil is used mainly for cultivated crops. Some areas are used as woodland.

This soil is well suited to cultivated crops, especially soybeans, tobacco, small grain, and corn. It is moderately droughty. Crop yields can be increased by applying lime and fertilizer. The cation-exchange capacity is low, and starter applications of complete plant nutrients are needed. Plant nutrients, such as sulfates, calcium, magnesium, and potassium, tend to accumulate in the upper part of the subsoil. Soil tests should include both the surface layer and the subsoil for proper interpretation of residual fertility levels. Applications of lime are needed for most crops. Side dressings of nitrogen are needed for those crops that require nitrogen. The erosion potential is medium. Conservation tillage and conservation cropping systems that include grasses and legumes help to control runoff and erosion.

This soil is well suited to pasture grasses and legumes. Low fertility and acidity are limitations. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 110 cubic feet. The soil can be easily managed for timber.

This soil is moderately suited to building site development. It is limited by wetness and the shrink-swell potential. Providing a foundation drainage system and strengthening the foundation help to overcome these limitations.

This soil is poorly suited to septic tank absorption fields. It is limited by the wetness and the slow permeability. Placing the absorption field above the level of the seasonal high water table and increasing the size of the absorption field help to overcome these limitations.

This soil is moderately suited to local roads and streets. It is limited by low strength. Using a suitable road base material helps to overcome this limitation.

The capability subclass is IIe. The woodland ordination symbol is 8A.

12C—Mattaponi sandy loam, 6 to 10 percent slopes. This soil is very deep, moderately well drained, and sloping. It formed in loamy and clayey fluvial and marine sediments on upland side slopes in the eastern part of the county. Individual areas range from about 5 to 20 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown sandy loam

Subsurface layer:
2 to 13 inches, yellowish brown sandy loam

Subsoil:
13 to 19 inches, strong brown clay loam
19 to 29 inches, strong brown clay
29 to 37 inches, strong brown clay that has brownish yellow and red mottles
37 to 46 inches, strong brown clay
46 to 72 inches, mottled strong brown, brownish yellow, reddish yellow, and very pale brown clay

Included with this soil in mapping are Emporia, Roanoke, and Slagle soils. The well drained Emporia soils are in landscape positions similar to those of the Mattaponi soil. The poorly drained Roanoke soils are in depressions and drainageways. The moderately well drained Slagle soils have less clay in the subsoil than the Mattaponi soil. They are in depressions and drainageways. Included soils make up about 15 percent of the map unit.

Important properties of the Mattaponi soil—

Permeability: Moderately slow
Depth to the water table: 36 to 72 inches
Available water capacity: High
Surface runoff: Medium
Shrink-swell potential: Moderate
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid or strongly acid

This soil is used mainly as woodland. Some areas are used for cultivated crops.

This soil is moderately suited to cultivated crops. Crop production is limited by the slope, low fertility, a low content of organic matter, and acidity. The soil is moderately droughty. Crop yields can be increased by applying lime and fertilizer. The cation-exchange capacity is low, and starter applications of complete plant nutrients are needed. Plant nutrients, such as sulfates, calcium, magnesium, and potassium, tend to accumulate in the upper part of the subsoil. Soil tests should include both the surface layer and the subsoil for proper interpretation of residual fertility levels. Applications of lime are needed for most crops. Side dressings of nitrogen are needed for those crops that require nitrogen. The erosion potential is high. Conservation tillage and conservation cropping systems that include grasses and legumes help to control runoff and erosion.

This soil is well suited to pasture grasses and legumes. The low fertility and the acidity are limitations. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper

stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 110 cubic feet. The soil can be easily managed for timber.

This soil is moderately suited to building site development. It is limited by the wetness, the slope, and the shrink-swell potential. Providing a foundation drainage system, using special architectural design, and strengthening the foundation help to overcome these limitations.

This soil is poorly suited to septic tank absorption fields. It is limited by the wetness, the slow permeability, and the slope. Placing the absorption field above the level of the seasonal high water table, increasing the size of the absorption field, and placing the field on the contour help to overcome these limitations.

This soil is moderately suited to local roads and streets. It is limited by low strength and the slope. Using a suitable road base material and using special designs help to overcome these limitations.

The capability subclass is IIIe. The woodland ordination symbol is 8A.

13B—Mattaponi-Urban land complex, 0 to 6 percent slopes. This map unit consists of a very deep, moderately well drained, gently sloping soil and areas of Urban land. It is on upland summits and shoulders in the eastern part of the county. It is about 40 percent Mattaponi soil, 40 percent Urban land, and 20 percent other soils. Individual areas range from about 5 to 200 acres in size. The Mattaponi soil and the areas of Urban land are so intermingled that it is not practical to map them separately.

The typical sequence, depth, and composition of the layers of the Mattaponi soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown sandy loam

Subsurface layer:
2 to 13 inches, yellowish brown sandy loam

Subsoil:
13 to 19 inches, strong brown clay loam
19 to 29 inches, strong brown clay
29 to 37 inches, strong brown clay that has brownish yellow and red mottles
37 to 46 inches, strong brown clay
46 to 72 inches, mottled strong brown, brownish yellow, reddish yellow, and very pale brown clay

The Urban land consists of asphalt, concrete, buildings, or other impervious surfaces.

Included in mapping are Emporia, Roanoke, and Slagle soils. The well drained Emporia soils are in landscape positions similar to those of the Mattaponi soil. The poorly drained Roanoke soils are in depressions and drainageways. The moderately well drained Slagle soils have less clay in the subsoil than the Mattaponi soil. They are in depressions and drainageways. Included soils make up about 15 percent of the map unit.

Important properties of the Mattaponi soil—

Permeability: Moderately slow
Depth to the water table: 36 to 72 inches
Available water capacity: High
Surface runoff: Slow or medium
Shrink-swell potential: Moderate
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid or strongly acid

This map unit is used mainly for urban development. It is not suited to cultivated crops, pasture grasses and legumes, or woodland.

This map unit is moderately suited to building site development. The Mattaponi soil is limited by wetness and the shrink-swell potential. Providing a foundation drainage system and strengthening the foundation help to overcome these limitations.

This map unit is serviced by community sewer systems in most areas. It is poorly suited to septic tank absorption fields. The Mattaponi soil is limited by the wetness and the moderately slow permeability. Placing the absorption field above the level of the seasonal high water table and increasing the size of the absorption field help to overcome these limitations.

This map unit is moderately suited to local roads and streets. The Mattaponi soil is limited by low strength. Using a suitable road base material helps to overcome this limitation.

No capability subclass is assigned. The woodland ordination symbol for the Mattaponi soil is 8A.

14A—Myatt silt loam, 0 to 2 percent slopes, occasionally flooded. This soil is very deep, poorly drained, and level or nearly level. It formed in loamy fluvial and marine sediments, mainly on broad stream terraces but also on upland flats in the eastern part of the county. Individual areas range from about 5 to 75 acres in size. On the broad stream terraces, the chance of flooding is 5 to 50 percent in any year under usual weather conditions.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, dark gray silt loam that has very dark grayish brown mottles

Subsurface layer:
4 to 7 inches, light gray loam that has brownish yellow and yellowish brown mottles

Subsoil:
7 to 13 inches, light brownish gray loam that has brownish yellow and strong brown mottles
13 to 42 inches, light gray sandy clay loam that has yellowish brown and strong brown mottles

Substratum:
42 to 72 inches, light gray sandy clay loam that has yellowish brown and strong brown mottles

Included with this soil in mapping are Roanoke, Slagle, and Uchee soils. The poorly drained Roanoke soils have more clay in the subsoil than the Myatt soil. They are in landscape positions similar to those of the Myatt soil. The moderately well drained Slagle and well drained Uchee soils are on the higher summits and shoulders. Also included, in areas along Stony Creek, are soils that have a very gravelly substratum. Included soils make up about 15 percent of the map unit.

Important properties of the Myatt soil—

Permeability: Moderately slow or moderate
Depth to the water table: 0 to 12 inches
Available water capacity: High
Surface runoff: Slow
Shrink-swell potential: Low
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsurface layer; extremely acid to strongly acid in the rest of the profile

This soil is used mainly as woodland. A few areas are used for cultivated crops.

This soil is poorly suited to cultivated crops. Crop production is limited by the flooding, low fertility, acidity, and wetness. The erosion potential is low.

This soil is moderately suited to hay and pasture grasses. The wetness, the flooding, the acidity, and the low fertility are limitations. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity of loblolly pine on this soil is very high. The estimated annual production of wood per acre is 127 cubic feet. The wetness and the flooding limit the use of equipment and may cause seedling mortality. Plant competition interferes with the establishment of desirable timber species.

This soil is poorly suited to building site development. It is limited by the flooding and the wetness. Protecting the soil from flooding and providing a foundation drainage system help to overcome these limitations.

This soil is poorly suited to septic tank absorption fields. It is limited by the flooding, the wetness, and the moderately slow permeability. Protecting the soil from flooding, placing the absorption field above the level of the seasonal high water table, and increasing the size of the absorption field help to overcome these limitations.

This soil is poorly suited to local roads and streets. It is limited by the flooding and the wetness. Protecting the soil from flooding and placing the roadbed above the level of the seasonal high water table help to overcome these limitations.

The capability subclass is IVw. The woodland ordination symbol is 9W.

15B—Nansemond sandy loam, 2 to 6 percent slopes. This soil is very deep, moderately well drained, and gently sloping. It formed in loamy fluvial and marine sediments on stream terraces in the eastern part of the county. Individual areas range from about 5 to 20 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, grayish brown sandy loam

Subsoil:
8 to 14 inches, brown sandy loam
14 to 19 inches, pale brown sandy loam that has light brownish gray mottles
19 to 25 inches, very pale brown sandy loam that has light brownish gray mottles
25 to 30 inches, very pale brown sandy loam that has light gray mottles
30 to 35 inches, light yellowish brown loamy sand that has light gray mottles
35 to 41 inches, light yellowish brown loamy sand that has light gray mottles
41 to 49 inches, very pale brown loamy sand that has brownish yellow mottles

Substratum:
49 to 72 inches, light yellowish brown sandy clay loam that has light gray and yellowish brown mottles

Included with this soil in mapping are Altavista, Emporia, Mattaponi, Roanoke, Slagle, and State soils. The moderately well drained Altavista soils have more clay in the subsoil than the Nansemond soil. They are in landscape positions similar to those of the Nansemond soil. The well drained Emporia soils are on adjacent uplands. The moderately well drained

Mattaponi and Slagle soils have more clay in the subsoil than the Nansemond soil. They are on adjacent uplands. The poorly drained Roanoke soils are on adjacent flood plains and in depressions. The well drained State soils are in landscape positions similar to those of the Nansemond soil. Included soils make up about 15 percent of the map unit.

Important properties of the Nansemond soil—

Permeability: Moderately rapid in the subsoil; rapid in the substratum
Depth to the water table: 18 to 30 inches
Available water capacity: Moderate
Surface runoff: Medium
Shrink-swell potential: Low
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Extremely acid to strongly acid

This soil is used mainly as woodland. Some areas are used for cultivated crops.

This soil is well suited to cultivated crops. Crop yields can be increased by applying lime and fertilizer. Surface leaching of plant nutrients occurs, and sulfates, calcium, magnesium, and potassium tend to accumulate in the upper part of the subsoil. Soil tests should include both the surface layer and the upper part of the subsoil for proper interpretation of residual fertility levels. The cation-exchange capacity is low, and a starter application of a complete fertilizer is needed. Split applications of nitrogen are recommended for crops that require nitrogen. Applications of lime are needed for most commonly grown crops. The erosion potential is medium. The soil is slightly droughty. Conservation tillage and conservation cropping systems that include grasses and legumes help to control runoff and erosion.

This soil is well suited to pasture grasses and legumes. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is very high. The estimated annual production of wood per acre is 130 cubic feet. Wetness limits the use of equipment.

This soil is moderately suited to building site development. It is limited by the wetness. Providing a foundation drainage system helps to overcome this limitation.

This soil is poorly suited to septic tank absorption fields. It is limited by the wetness. Placing the absorption field above the level of the seasonal high water table helps to overcome this limitation.

This soil is well suited to local roads and streets. It is limited by the wetness.

The capability subclass is IIe. The woodland ordination symbol is 9W.

15C—Nansemond sandy loam, 6 to 10 percent slopes. This soil is very deep, moderately well drained, and sloping. It formed in loamy fluvial and marine sediments on stream terraces in the eastern part of the county. Individual areas range from about 5 to 20 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, grayish brown sandy loam

Subsoil:
8 to 14 inches, brown sandy loam
14 to 19 inches, pale brown sandy loam that has light brownish gray mottles
19 to 25 inches, very pale brown sandy loam that has light brownish gray mottles
25 to 30 inches, very pale brown sandy loam that has light gray mottles
30 to 35 inches, light yellowish brown loamy sand that has light gray mottles
35 to 41 inches, light yellowish brown loamy sand that has light gray mottles
41 to 49 inches, very pale brown loamy sand that has brownish yellow mottles

Substratum:
49 to 72 inches, light yellowish brown sandy clay loam that has light gray and yellowish brown mottles

Included with this soil in mapping are Altavista, Emporia, Mattaponi, Roanoke, and Slagle soils. The moderately well drained Altavista soils have more clay in the subsoil than the Nansemond soil. They are in landscape positions similar to those of the Nansemond soil. The well drained Emporia soils are on adjacent uplands. The moderately well drained Mattaponi and Slagle soils have more clay in the subsoil than the Nansemond soil. They are on adjacent uplands. The poorly drained Roanoke soils are on adjacent flood plains and in depressions. The well drained State soils are in landscape positions similar to those of the Nansemond soil. Included soils make up about 15 percent of the map unit.

Important properties of the Nansemond soil—

Permeability: Moderately rapid in the subsoil; rapid in the substratum
Depth to the water table: 18 to 30 inches
Available water capacity: Moderate
Surface runoff: Rapid

Shrink-swell potential: Low
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Extremely acid to strongly acid

This soil is used mainly as woodland. Some areas are used for cultivated crops.

This soil is moderately suited to cultivated crops. Crop yields can be increased by applying lime and fertilizer. Surface leaching of plant nutrients occurs, and sulfates, calcium, magnesium, and potassium tend to accumulate in the upper part of the subsoil. Soil tests should include both the surface layer and the upper part of the subsoil for proper interpretation of residual fertility levels. The cation-exchange capacity is low, and a starter application of a complete fertilizer is needed. Split applications of nitrogen are recommended for crops that require nitrogen. Applications of lime are needed for most commonly grown crops. The erosion potential is high. The soil is slightly droughty. Conservation tillage and conservation cropping systems that include grasses and legumes help to control runoff and erosion.

This soil is well suited to pasture grasses and legumes. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is very high. The estimated annual production of wood per acre is 130 cubic feet. Wetness limits the use of equipment.

This soil is moderately suited to building site development. It is limited by the wetness and the slope. Providing a foundation drainage system and using special architectural design help to overcome these limitations.

This soil is moderately suited to septic tank absorption fields. It is limited by the wetness and the slope. Placing the absorption field above the level of the seasonal high water table and placing the field on the contour help to overcome these limitations.

This soil is moderately suited to local roads and streets. It is limited by the wetness and the slope. Special designs help to overcome this limitation.

The capability subclass is IIIe. The woodland ordination symbol is 9W.

16A—Roanoke loam, 0 to 2 percent slopes, occasionally flooded. This soil is very deep, poorly drained, and level or nearly level. It formed in loamy and clayey fluvial sediments on broad flats and in depressions on flood plains and terraces in all parts of the county. Individual areas range from about 5 to 500 acres in size. On the flood plains, the chance of flooding is 5 to 50 percent in any year under usual weather conditions.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, very dark gray loam

Subsurface layer:
4 to 8 inches, grayish brown loam that has very dark grayish brown and dark yellowish brown mottles

Subsoil:
8 to 15 inches, grayish brown clay loam that has yellowish brown and yellowish red mottles
15 to 40 inches, gray clay that has yellowish brown mottles
40 to 52 inches, gray clay that has strong brown mottles

Substratum:
52 to 72 inches, gray clay that has strong brown mottles

Included with this soil in mapping in areas of the Coastal Plain are Altavista, Myatt, Nansemond, and Slagle soils. The moderately well drained Altavista, Nansemond, and Slagle soils are in higher positions on the landscape than the Roanoke soil. The poorly drained Myatt soils have less clay in the subsoil than the Roanoke soil. They are in landscape positions similar to those of the Roanoke soil. Included in mapping in the Piedmont area are Helena soils. The moderately well drained Helena soils are on upland foot slopes and are in higher positions on the landscape than the Roanoke soil. Included soils make up about 15 percent of the map unit.

Important properties of the Roanoke soil—

Permeability: Very slow or slow
Depth to the water table: 0 to 12 inches
Available water capacity: High
Surface runoff: Slow
Shrink-swell potential: Moderate
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Extremely acid to strongly acid

This soil is used mainly as woodland.

This soil is poorly suited to cultivated crops. Crop production is limited by the flooding and wetness. If crops are grown, yields can be increased by applying lime and fertilizer. The erosion potential is low.

This soil is poorly suited to pasture grasses and legumes. The wetness and the flooding are limitations.

The potential productivity for loblolly pine on this soil is very high. The estimated annual production of wood per acre is 125 cubic feet. The wetness and the flooding limit the use of equipment and may cause seedling mortality. Plant competition interferes with the establishment of desirable timber species.

This soil is poorly suited to building site development. It is limited by the flooding and the wetness. Protecting the soil from flooding and providing a foundation drainage system help to overcome these limitations.

This soil is poorly suited to septic tank absorption fields. It is limited by the flooding, the wetness, and the moderately slow permeability. Protecting the soil from flooding, placing the absorption field above the level of the seasonal high water table, and increasing the size of the absorption field help to overcome these limitations.

This soil is poorly suited to local roads and streets. It is limited by low strength, the flooding, and the wetness. Using a suitable road base material, protecting the soil from flooding, and placing the roadbed above the level of the seasonal high water table help to overcome these limitations.

The capability subclass is IVw. The woodland ordination symbol is 7W.

17A—Slagle sandy loam, 0 to 2 percent slopes. This soil is very deep, moderately well drained, and level or nearly level. It formed in loamy fluvial and marine sediments on broad upland flats in the eastern part of the county. Individual areas range from about 5 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, brown sandy loam

Subsurface layer:
4 to 9 inches, pale brown sandy loam

Subsoil:
9 to 14 inches, light yellowish brown sandy loam
14 to 24 inches, yellowish brown sandy clay loam that has yellowish brown mottles
24 to 30 inches, light olive brown sandy clay loam that has reddish brown and yellowish brown mottles
30 to 44 inches, yellowish brown sandy clay loam that has light brownish gray and yellowish red mottles

Substratum:
44 to 72 inches, mottled yellowish brown, light brownish gray, and yellowish red sandy loam

Included with this soil in mapping are Emporia, Mattaponi, Myatt, and Roanoke soils. The well drained Emporia and moderately well drained Mattaponi soils are in higher positions on the landscape than the Slagle soil. Mattaponi soils have more clay in the subsoil than the Slagle soil. The poorly drained Myatt and Roanoke soils are in depressions and drainageways. Included soils make up about 15 percent of the map unit.

Important properties of the Slagle soil—

Permeability: Moderate in the upper part of the subsoil; slow or moderately slow in the lower part; moderately slow to moderately rapid in the substratum
Depth to the water table: 18 to 36 inches
Available water capacity: High
Surface runoff: Slow
Shrink-swell potential: High
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Extremely acid to strongly acid

This soil is used mainly for cultivated crops. Some areas are used as woodland.

This soil is well suited to cultivated crops, especially soybeans and corn. Crop yields can be increased by applying lime and fertilizer. Surface leaching of plant nutrients occurs, and sulfates, calcium, magnesium, and potassium tend to accumulate in the upper part of the subsoil. Soil tests should include both the surface layer and the upper part of the subsoil for proper interpretation of residual fertility levels. The cation-exchange capacity is low, and a starter application of a complete fertilizer is needed. Split applications of nitrogen are recommended for crops that require nitrogen. Applications of lime are needed for most commonly grown crops. Wet soil material adheres to peanuts during harvesting, resulting in broken pegs, reduced yields, and lower grades. Small grain tends to become lodged. The erosion potential is low.

This soil is well suited to pasture grasses and legumes. Wetness is a limitation. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is very high. The estimated annual production of wood per acre is 125 cubic feet. The soil can be easily managed for timber.

This soil is moderately suited to building site development. It is limited by the wetness. Providing a foundation drainage system helps to overcome this limitation.

This soil is poorly suited to septic tank absorption fields. It is limited by the wetness and the moderately slow permeability. Placing the absorption field above the level of the seasonal high water table and increasing the size of the absorption field help to overcome these limitations.

This soil is moderately suited to local roads and streets. It is limited by low strength and the wetness. Using a suitable road base material helps to overcome these limitations.

The capability subclass is IIw. The woodland ordination symbol is 9W.

17B—Slagle sandy loam, 2 to 6 percent slopes. This soil is very deep, moderately well drained, and gently sloping. It formed in loamy fluvial and marine sediments on broad upland flats, toe slopes, and saddles and in drainageways in the eastern part of the county. Individual areas range from about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, brown sandy loam

Subsurface layer:
4 to 9 inches, pale brown sandy loam

Subsoil:
9 to 14 inches, light yellowish brown sandy loam
14 to 24 inches, yellowish brown sandy clay loam that has yellowish brown mottles
24 to 30 inches, light olive brown sandy clay loam that has reddish brown and yellowish brown mottles
30 to 44 inches, yellowish brown sandy clay loam that has light brownish gray and yellowish red mottles

Substratum:
44 to 72 inches, mottled yellowish brown, light brownish gray, and yellowish red sandy loam

Included with this soil in mapping are Emporia, Mattaponi, Myatt, and Roanoke soils. The well drained Emporia and moderately well drained Mattaponi soils are on summits and shoulders. Mattaponi soils have more clay in the subsoil than the Slagle soil. The poorly drained Myatt and Roanoke soils are in depressions and drainageways. Included soils make up about 15 percent of the map unit.

Important properties of the Slagle soil—

Permeability: Moderate in the upper part of the subsoil; slow or moderately slow in the lower part; moderately slow to moderately rapid in the substratum
Depth to the water table: 18 to 36 inches
Available water capacity: High
Surface runoff: Medium
Shrink-swell potential: High
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Extremely acid to strongly acid

This soil is used mainly for cultivated crops or as woodland.

This soil is well suited to cultivated crops, especially soybeans and corn. Crop yields can be increased by applying lime and fertilizer. Surface leaching of plant nutrients occurs, and sulfates, calcium, magnesium, and potassium tend to accumulate in the upper part of the subsoil. Soil tests should include both the surface layer and the upper part of the subsoil for proper interpretation of residual fertility levels. The cation-exchange capacity is relatively low, and a starter application of a complete fertilizer is needed. Split applications of nitrogen are recommended for crops that require nitrogen. Applications of lime are needed for most commonly grown crops. Wet soil material adheres to peanuts during harvesting, resulting in broken pegs, reduced yields, and lower grades. Small grain tends to become lodged. The erosion potential is medium. A conservation tillage system and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion. Planting cover crops reduces the hazard of wind erosion.

This soil is well suited to pasture grasses and legumes. Wetness is a limitation. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is very high. The estimated annual production of wood per acre is 125 cubic feet. The soil can be easily managed for timber.

This soil is moderately suited to building site development. It is limited by the wetness. Providing a foundation drainage system helps to overcome this limitation.

This soil is poorly suited to septic tank absorption fields. It is limited by the wetness and the moderately slow permeability. Placing the absorption field above the level of the seasonal high water table and increasing the size of the absorption field help to overcome these limitations.

This soil is moderately suited to local roads and streets. It is limited by low strength and the wetness.

Using a suitable road base material helps to overcome these limitations.

The capability subclass is IIe. The woodland ordination symbol is 9W.

17C—Slagle sandy loam, 6 to 10 percent slopes. This soil is very deep, moderately well drained, and sloping. It formed in loamy fluvial and marine sediments on upland side slopes along drainageways in the eastern part of the county. Individual areas range from about 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, brown sandy loam

Subsurface layer:
4 to 9 inches, pale brown sandy loam

Subsoil:
9 to 14 inches, light yellowish brown sandy loam
14 to 24 inches, yellowish brown sandy clay loam that has yellowish brown mottles
24 to 30 inches, light olive brown sandy clay loam that has reddish brown and yellowish brown mottles
30 to 44 inches, yellowish brown sandy clay loam that has light brownish gray and yellowish red mottles

Substratum:
44 to 72 inches, mottled yellowish brown, light brownish gray, and yellowish red sandy loam

Included with this soil in mapping are Emporia, Mattaponi, Myatt, and Roanoke soils. The well drained Emporia and moderately well drained Mattaponi soils are on summits and shoulders. Mattaponi soils have more clay in the subsoil than the Slagle soil. The poorly drained Myatt and Roanoke soils are in depressions and drainageways. Included soils make up about 15 percent of the map unit.

Important properties of the Slagle soil—

Permeability: Moderately slow or moderate in the subsoil; moderately slow to moderately rapid in the substratum
Depth to the water table: 18 to 36 inches
Available water capacity: High
Surface runoff: Rapid
Shrink-swell potential: High
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Extremely acid to strongly acid

This soil is used mainly as woodland. A few areas are used for cultivated crops.

This soil is moderately suited to cultivated crops. Crop yields can be increased by applying lime and fertilizer. Surface leaching of plant nutrients occurs, and sulfates, calcium, magnesium, and potassium tend to accumulate in the upper part of the subsoil. The cation-exchange capacity is relatively low, and a starter application of a complete fertilizer is needed. Split applications of nitrogen are recommended for crops that require nitrogen. Applications of lime are needed for most commonly grown crops. Crop production is limited by the slope, low fertility, a low content of organic matter, and acidity. The erosion potential is high. A conservation tillage system and a cropping system that includes grasses and legumes reduce the runoff rate and help to control erosion. Planting cover crops reduces the hazard of wind erosion.

This soil is moderately suited to pasture grasses and legumes. Wetness is a limitation. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is very high. The estimated annual production of wood per acre is 125 cubic feet. The soil can be easily managed for timber.

This soil is moderately suited to building site development. It is limited by the wetness and the slope. Providing a foundation drainage system and using special architectural design help to overcome these limitations.

This soil is poorly suited to septic tank absorption fields. It is limited by the wetness, the moderately slow permeability, and the slope. Placing the absorption field above the level of the seasonal high water table, increasing the size of the absorption field, and placing the field on the contour help to overcome these limitations.

This soil is moderately suited to local roads and streets. It is limited by low strength, the wetness, and the slope. Using a suitable road base material and using special designs help to overcome these limitations.

The capability subclass is IIIe. The woodland ordination symbol is 9W.

18A—State fine sandy loam, 0 to 2 percent slopes, occasionally flooded. This soil is very deep, well drained, and level or nearly level. It formed in loamy fluvial sediments on stream terraces in the eastern part of the county, primarily along Stony Creek. Individual

areas range from about 5 to 40 acres in size. The chance of flooding is 5 to 50 percent in any year under usual weather conditions.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, brown fine sandy loam

Subsoil:
8 to 13 inches, light yellowish brown sandy clay loam
13 to 35 inches, yellowish brown sandy clay loam
35 to 42 inches, brownish yellow sandy loam that has light yellowish brown mottles

Substratum:
42 to 72 inches, brownish yellow sandy loam that has light yellowish brown mottles

Included with this soil in mapping are Altavista, Nansemond, Myatt, and Roanoke soils. The moderately well drained Altavista and Nansemond soils are in landscape positions similar to those of the State soil. The poorly drained Myatt and Roanoke soils are on flood plains or in depressions. Included soils make up about 15 percent of the map unit.

Important properties of the State soil—

Permeability: Moderate in the subsoil; moderately rapid or rapid in the substratum
Depth to the water table: 48 to 72 inches
Available water capacity: Moderate
Surface runoff: Slow
Shrink-swell potential: Low
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Extremely acid to strongly acid in the solum; extremely acid to slightly acid in the substratum

This soil is used mainly for cultivated crops. Some areas are used as woodland.

This soil is well suited to cultivated crops, especially peanuts, corn, tobacco, and soybeans. The soil is droughty. It has a sandy surface layer. The cation-exchange capacity is low. Surface leaching of nitrogen, sulfates, calcium, magnesium, and potassium occurs, but calcium, magnesium, sulfates, and potassium tend to accumulate in the upper part of the subsoil. Soil tests should include both the surface layer and the upper part of the subsoil for proper interpretation of residual fertility levels. Starter applications of a complete fertilizer are needed, and split applications of nitrogen are recommended. Crop yields can be increased by applying lime and fertilizer. Applications of fertilizer and lime and the seasonal moisture changes produce fluctuations in the amount of available plant nutrients in the sandy surface layer. Calcium and magnesium levels in the soil fluctuate widely. A yearly or biannual application of small amounts of lime is required. The erosion potential is low. Planting cover crops reduces the hazard of wind erosion and increases the content of organic matter.

This soil is well suited to pasture grasses and legumes. Good pasture management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is very high. The estimated annual production of wood per acre is 140 cubic feet. The soil can be easily managed for timber.

This soil is moderately suited to building site development, septic tank absorption fields, and local roads and streets. It is limited by the flooding.

The capability subclass is IIw. The woodland ordination symbol is 9A.

19B—Uchee loamy sand, 0 to 6 percent slopes. This soil is very deep, well drained, and level or nearly level to gently sloping. It formed in sandy and loamy fluvial and marine sediments on broad upland flats, summits, and shoulders in the eastern part of the county. Individual areas range from about 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, grayish brown loamy sand

Subsurface layer:
9 to 32 inches, light yellowish brown loamy sand

Subsoil:
32 to 46 inches, yellowish brown sandy clay loam that has brown mottles

Substratum:
46 to 72 inches, yellowish brown sandy clay loam that has red, brown, and light brownish gray mottles

Included with this soil in mapping are Emporia and Slagle soils. The well drained Emporia soils have a loamy surface layer. They are in landscape positions similar to those of the Uchee soil. The moderately well drained Slagle soils are in lower positions on the landscape than the Uchee soil. Included soils make up about 15 percent of the map unit.

Important properties of the Uchee soil—

Permeability: Rapid in the surface layer and subsurface layer; moderately slow or moderate in the subsoil; moderately slow to moderately rapid in the substratum
Depth to the water table: 42 to 60 inches
Available water capacity: Moderate
Surface runoff: Slow
Shrink-swell potential: Moderate
Rooting depth: More than 45 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid or strongly acid

This soil is used mainly for cultivated crops. Some areas are used as woodland.

This soil is well suited to cultivated crops, such as corn, soybeans, and tobacco. The soil has a thick, sandy surface layer. The cation-exchange capacity is low. Plant nutrients are highly subject to leaching, and starter applications of a complete fertilizer are needed for most crops. Split applications of nitrogen are recommended. The soil is naturally low in sulfur, except in areas where gypsum has been applied for peanut production. The amount of trace elements in the soil is commonly low. Applications of lime are needed for most commonly grown crops. The erosion potential is medium. Conservation tillage and conservation cropping systems that include grasses and legumes help to control runoff and erosion.

This soil is well suited to pasture grasses and legumes. The thick, sandy surface layer is a limitation. If this soil is used for pasture, good management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 115 cubic feet. The soil can be easily managed for timber.

This soil is moderately suited to building site development. It is limited by the wetness and the shrink-swell potential. Providing a foundation drainage system and strengthening the foundation help to overcome these limitations.

This soil is poorly suited to septic tank absorption fields. It is limited by the wetness and the slow permeability. Placing the absorption field above the level of the seasonal high water table and increasing the size of the field help to overcome these limitations.

This soil is well suited to local roads and streets.

The capability subclass is IIIs. The woodland ordination symbol is 8S.

19C—Uchee loamy sand, 6 to 10 percent slopes. This soil is very deep, well drained, and sloping. It formed in sandy and loamy fluvial and marine sediments on upland side slopes in the eastern part of the county. Individual areas range from about 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, grayish brown loamy sand

Subsurface layer:
9 to 32 inches, light yellowish brown loamy sand

Subsoil:
32 to 46 inches, yellowish brown sandy clay loam that has brown mottles

Substratum:
46 to 72 inches, yellowish brown sandy clay loam that has red, brown, and light brownish gray mottles

Included with this soil in mapping are Emporia and Slagle soils. The well drained Emporia and moderately well drained Slagle soils are in landscape positions similar to those of the Uchee soil. Emporia soils have a loamy surface layer. Included soils make up about 15 percent of the map unit.

Important properties of the Uchee soil—

Permeability: Rapid in the surface layer and subsurface layer; moderately slow or moderate in the subsoil; moderately slow to moderately rapid in the substratum
Depth to the water table: 42 to 60 inches
Available water capacity: Moderate
Surface runoff: Slow
Shrink-swell potential: Moderate
Rooting depth: More than 60 inches
Depth to bedrock: More than 60 inches
Soil reaction: Very strongly acid or strongly acid

This soil is used mainly as woodland. Some areas are used for cultivated crops.

This soil is moderately suited to cultivated crops. The soil has a thick, sandy surface layer. The cation-exchange capacity is low. Plant nutrients are highly subject to leaching, and starter applications of a complete fertilizer are needed for most crops. Split applications of nitrogen are recommended. The soil is naturally low in sulfur, except in areas where gypsum has been applied for peanut production. The amount of trace elements in the soil is commonly low. Applications of lime are needed for most commonly grown crops. The erosion potential is high. Conservation tillage and

conservation cropping systems that include grasses and legumes help to control runoff and erosion.

This soil is poorly suited to pasture grasses and legumes. The thick, sandy surface layer is a limitation. If this soil is used for pasture, good management practices include maintaining a mixture of grasses and legumes, rotating and deferring grazing, controlling weeds, using proper stocking rates, and applying lime and fertilizer.

The potential productivity for loblolly pine on this soil is high. The estimated annual production of wood per acre is 115 cubic feet. The soil can be easily managed for timber, although the slope may be a limitation during harvesting.

This soil is moderately suited to building site development. It is limited by wetness, the shrink-swell potential, and the slope. Providing a foundation drainage system, strengthening the foundation, and using special architectural design help to overcome these limitations.

This soil is poorly suited to septic tank absorption fields. It is limited by the wetness, the slow permeability, and the slope. Placing the absorption field above the level of the seasonal high water table, increasing the size of the field, and placing the field on the contour help to overcome these limitations.

This soil is well suited to local roads and streets. It is limited by the slope. Special designs help to overcome this limitation.

The capability subclass is IVs. The woodland ordination symbol is 8S.

20—Udorthents, 0 to 25 percent slopes. These soils are shallow to very deep, well drained to somewhat poorly drained, and level to moderately steep. They are on uplands throughout the county. Individual areas range from about 5 to 300 acres in size.

Because of the variability of the Udorthents, a typical profile is not described. Areas of Udorthents consist of open excavations from which soil, gravel, metamorphic rock, and other materials have been removed for use as roadfill or as fill for construction. Some areas have been filled and smoothed. The thickness of the fill is variable but is generally more than 20 inches. The fill is mainly soil material. It ranges from sandy loam to clay. The soils covered by fill material are poorly drained to somewhat excessively drained.

Included in mapping are Appling, Cecil, Mattaponi, and Roanoke soils. These developed soils are in landscape positions similar to those of the Udorthents.

Important properties of the Udorthents—

Permeability: Very slow to moderately rapid
Depth to the water table: 10 to more than 60 inches
Available water capacity: Low to high
Surface runoff: Very slow to rapid
Shrink-swell potential: Low to very high
Rooting depth: 10 to more than 60 inches
Depth to bedrock: 10 to more than 60 inches
Soil reaction: Extremely acid to moderately alkaline

Areas of these soils are used for airports, highways, railroads, borrow pits, quarries, or wildlife habitat. Lime and fertilizer are needed to establish grasses and other vegetation.

These soils are extremely variable. Onsite investigation is needed to determine land use potential. Ground water may be contaminated by pollutants.

No capability subclass or woodland ordination symbol is assigned.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban or built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 208,000 acres in the survey area, or nearly 63 percent of the total acreage, meets the soil requirements for prime farmland. Scattered areas of this land are throughout the county.

The map units in the survey area that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Natural Resources Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X*, stoniness or rockiness; *W*, excess water in or on the soil; *T*, toxic substances in the soil; *D*, restricted rooting depth; *C*, clay in the upper part of the soil; *S*, sandy texture; *F*, a high content of rock fragments in the soil; and *N*, snowpack. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, F, and N.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed are also subject to erosion.

Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment and season of use are not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *productivity class*. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *productivity class*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic meters per hectare per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It generally is the most common species on the soil and is the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Recreation

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design,

intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface

stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan

detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the "Glossary."

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 11 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and

one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal

of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated

use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind erosion or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the "Glossary."

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil

to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.
2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.
3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.
5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.
6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control wind erosion are used.
7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control wind erosion are used.
8. Soils that are not subject to wind erosion because of coarse fragments on the surface or because of surface wetness.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in table 16, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent

slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16. Only saturated zones within a depth of about 6 feet are indicated.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate,* or *high.* It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(3)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 17 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udult*, the suborder of the Ultisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is clayey, mixed, thermic Typic Hapludults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(4)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(3)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Altavista Series

Soils of the Altavista series are very deep and are moderately well drained. They formed in fluvial sediments. They are on stream terraces in the Coastal

Plain physiographic province. Slope ranges from 0 to 6 percent.

Altavista soils are near Roanoke and State soils. Roanoke soils have mottles with chroma of 2 directly below the A horizon. State soils do not have mottles with chroma of 2 in the upper 24 inches of the control section.

Typical pedon of Altavista fine sandy loam, 0 to 2 percent slopes, occasionally flooded, about 3,700 feet east of the intersection of Virginia Highways 626 and 666, about 200 feet north of Virginia Highway 666, in southeastern Dinwiddie County:

Ap—0 to 10 inches; brown (10YR 4/3) fine sandy loam; weak medium granular structure; very friable; many fine roots; moderately acid; abrupt smooth boundary.

Bt1—10 to 15 inches; brownish yellow (10YR 6/6) sandy clay loam; common medium distinct strong brown (7.5YR 5/8) mottles; weak fine subangular blocky structure; friable; few fine roots; moderately acid; clear smooth boundary.

Bt2—15 to 22 inches; yellowish brown (10YR 5/6) clay loam; common medium prominent reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few fine flakes of mica; few faint clay films on faces of peds; moderately acid; clear smooth boundary.

Bt3—22 to 30 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium prominent reddish yellow (7.5YR 6/8) and few medium prominent light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable, sticky and plastic; few fine roots; few fine flakes of mica; few faint clay films on faces of peds; moderately acid; gradual smooth boundary.

Bt4—30 to 37 inches; yellowish brown (10YR 5/8) sandy clay loam; common medium prominent light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine flakes of mica; few faint clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt5—37 to 42 inches; light yellowish brown (10YR 6/4) sandy clay loam; many medium distinct light brownish gray (10YR 6/2) and common medium distinct yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable, sticky and plastic; few fine flakes of mica; very strongly acid; clear smooth boundary.

BCg—42 to 49 inches; light brownish gray (10YR 6/2) sandy clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; very friable; few fine flakes of mica; strongly acid; gradual smooth boundary.

C—49 to 72 inches; mottled gray (10YR 6/1) and yellowish brown (10YR 5/6), stratified sandy loam and loamy sand; massive; friable; few fine flakes of mica; strongly acid.

The thickness of the solum ranges from 30 to 60 inches. The depth to bedrock is more than 120 inches. The content of gravel ranges from 0 to 5 percent in the A, Ap, Bt, and BC horizons and from 0 to 50 percent in the C horizon. Reaction ranges from extremely acid to moderately acid throughout the profile.

The A or Ap horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 1 to 4.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 4 to 8. It is mottled in shades of brown and red. It is loam, clay loam, or sandy clay loam.

The BC horizon, if it occurs, has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8. It is mottled in shades of gray, brown, and red. It is loam, sandy loam, or sandy clay loam.

The BCg horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is mottled in shades of gray, brown, and red. It is loam, sandy loam, or sandy clay loam.

The C horizon is mottled in shades of gray, red, brown, yellow, and olive. It is stratified sandy or loamy soil material in the fine-earth fraction.

Appling Series

Soils of the Appling series are very deep and are well drained. They formed in residuum derived from acid crystalline rock on uplands in the Piedmont physiographic province. Slope ranges from 2 to 25 percent.

Appling soils are near Helena, Mattaponi, and Roanoke soils. Helena and Roanoke soils have mottles with chroma of 2. Mattaponi soils have rounded quartz gravel in the solum.

Typical pedon of Appling sandy loam, 2 to 7 percent slopes, about 3,600 feet from the junction of Virginia Highway 623 and Virginia Highway 750, about 980 feet northwest of Virginia Highway 750, about 100 feet from the northeast corner of the VEPCO tower, in northern Dinwiddie County:

Ap—0 to 7 inches; olive brown (2.5Y 4/4) sandy loam; weak fine granular structure; friable; common fine, medium, and coarse roots; very strongly acid; clear wavy boundary.

E—7 to 11 inches; brownish yellow (10YR 6/6) sandy loam; weak medium subangular blocky structure; friable, slightly sticky and nonplastic; common fine and medium roots; 5 percent gravel; very strongly acid; clear wavy boundary.
Bt1—11 to 16 inches; brownish yellow (10YR 6/8) sandy clay loam; moderate medium subangular blocky structure; firm, sticky and slightly plastic; few fine and medium roots; 5 percent gravel; strongly acid; clear smooth boundary.
Bt2—16 to 33 inches; brownish yellow (10YR 6/8) clay; common medium distinct red (2.5YR 5/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few fine and medium roots; few faint clay films on faces of peds; few fine flakes of mica; 5 percent gravel; strongly acid; gradual smooth boundary.
BC—33 to 43 inches; brownish yellow (10YR 6/8) sandy clay loam; many medium distinct red (2.5YR 5/8) mottles; weak medium subangular blocky structure; firm, sticky and slightly plastic; few fine and medium roots; few faint clay films on faces of peds and in old root channels; few fine flakes of mica; strongly acid; gradual smooth boundary.
C—43 to 72 inches; yellowish red (5YR 4/6) sandy loam; massive; friable, slightly sticky and nonplastic; few faint clay films on faces of peds; few fine flakes of mica; strongly acid.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock is more than 60 inches. The content of gravel ranges from 0 to 15 percent in the A, Ap, and E horizons, from 0 to 10 percent in the Bt and BC horizons, and from 0 to 15 percent in the C horizon. Reaction is very strongly acid or strongly acid throughout the profile.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 to 4.

The E horizon has hue of 5YR to 10YR, value of 5 or 6, and chroma of 4 to 6. It is coarse sandy loam, sandy loam, or fine sandy loam.

The Bt horizon has hue of 5YR to 2.5Y, value of 5 or 6, and chroma of 6 to 8. The lower part of the Bt horizon is mottled in shades of red, yellow, and brown. It is sandy clay, clay loam, or clay. It has a thin layer or subhorizon of sandy clay loam.

The BC horizon has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 6 to 8. It is clay loam or sandy clay loam.

The C horizon has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 6 to 8 or is mottled in shades of red, yellow, and brown. It is sandy clay loam, loam, or sandy loam.

Cecil Series

Soils of the Cecil series are very deep and are well drained. They formed in residuum derived from acid crystalline rock on uplands in the Piedmont physiographic province. Slope ranges from 2 to 25 percent.

Cecil soils are near Helena, Mattaponi, and Roanoke soils. Helena and Roanoke soils have mottles with chroma of 2. Mattaponi soils have rounded quartz gravel in the solum.

Typical pedon of Cecil sandy loam, 2 to 7 percent slopes, 982 feet from the junction of Virginia Highway 623 and Virginia Highway 750, about 39 feet northwest of Virginia Highway 750, in northern Dinwiddie County:

A—0 to 2 inches; dark yellowish brown (10YR 4/4) sandy loam; weak fine granular structure; friable, nonsticky and nonplastic; many fine and medium roots; very strongly acid; abrupt smooth boundary.
E—2 to 9 inches; strong brown (7.5YR 5/6) sandy loam; weak fine and medium granular structure; friable, nonsticky and nonplastic; many fine and medium roots; 2 percent gravel; very strongly acid; clear smooth boundary.
BE—9 to 12 inches; red (2.5YR 4/8) clay loam; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; common fine and medium roots; 2 percent gravel; strongly acid; clear smooth boundary.
Bt1—12 to 29 inches; red (10R 4/8) clay; moderate medium subangular blocky structure; firm, sticky and plastic; few medium roots; few faint clay films on faces of peds; few medium clay nodules; few fine flakes of mica; strongly acid; gradual wavy boundary.
Bt2—29 to 47 inches; red (10R 4/8) clay; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; few faint clay films on faces of peds; few fine and medium clay nodules; common fine flakes of mica; strongly acid; clear smooth boundary.
BC—47 to 55 inches; red (10R 4/8) clay loam; weak medium and coarse angular blocky structure; friable, slightly sticky and slightly plastic; common fine flakes of mica; strongly acid; gradual smooth boundary.
C—55 to 72 inches; red (2.5YR 4/8) sandy clay loam; massive; friable, nonsticky and nonplastic; many fine flakes of mica; strongly acid.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock is more than 78 inches. The content of gravel ranges from 0 to 15 percent in the A, Ap, E, and BE horizons and from 0 to 10 percent in

the Bt, BC, and C horizons. Reaction ranges from very strongly acid to slightly acid in the A, E, and BE horizons and is very strongly acid or strongly acid in the Bt, BC, and C horizons.

The A or Ap horizon has hue of 2.5YR to 10YR, value of 3 to 5, and chroma of 2 to 6. If the value is 3, the horizon is less than 6 inches thick. The A or Ap horizon is sandy loam in most areas. It is clay loam in most eroded areas.

The E horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. It is sandy loam or loam.

The BE horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 3 to 8. It is sandy clay loam or clay loam.

The Bt horizon has hue of 10R or 2.5YR, value of 4 or 5, and chroma of 6 to 8. In some pedons the lower part of the Bt horizon is mottled in shades of brown and yellow. The Bt horizon is clay loam or clay.

The BC horizon has hue of 10R to 5YR, value of 4 to 6, and chroma of 4 to 8. In some pedons it has mottles in shades of yellow or brown. It is sandy clay loam or clay loam.

The C horizon has colors similar to those of the BC horizon or is multicolored in shades of brown and yellow. It is sandy clay loam or loam.

Emporia Series

Soils of the Emporia series are very deep and are well drained. They formed in fluvial and marine sediments on broad uplands in the Coastal Plain physiographic province. Slope ranges from 0 to 25 percent.

Emporia soils are near Mattaponi, Nansemond, Roanoke, Slagle, and Uchee soils. Mattaponi soils have more than 35 percent clay in the subsoil. Nansemond, Roanoke, and Slagle soils have mottles with chroma of 2 within a depth of 36 inches. Uchee soils have thicker combined A and E horizons than the Emporia soils.

Typical pedon of Emporia sandy loam, 2 to 6 percent slopes, about 1,000 feet south of the intersection of Virginia Highways 688 and 667, about 300 feet east of Virginia Highway 667, in southeastern Dinwiddie County:

Ap—0 to 7 inches; brown (10YR 5/3) sandy loam; weak fine granular structure; very friable; many fine and medium roots; many fine tubular pores; strongly acid; clear smooth boundary.

E—7 to 12 inches; light yellowish brown (10YR 6/4) loam; weak medium granular structure; very friable; common fine roots; many fine tubular pores; strongly acid; clear smooth boundary.

BE—12 to 23 inches; light yellowish brown (10YR 6/4) loam; weak medium subangular blocky structure; friable; common fine and medium roots; many fine tubular pores; strongly acid; clear smooth boundary.

Bt1—23 to 30 inches; yellowish brown (10YR 5/4) loam; common medium distinct strong brown (7.5YR 5/4) mottles near the lower boundary; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common fine tubular pores; few faint clay films on faces of peds; strongly acid; clear wavy boundary.

Bt2—30 to 44 inches; yellowish brown (10YR 5/4) clay loam; common vertical tongues of brown (7.5YR 5/4), strong brown (7.5YR 5/6), and reddish brown (5YR 5/4); weak medium subangular blocky structure; friable, firm in place, slightly sticky and slightly plastic; few fine roots; common fine tubular pores; common distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt3—44 to 53 inches; brown (7.5YR 5/4) clay loam; common medium prominent yellowish red (5YR 5/6) mottles and common yellowish brown (10YR 5/4) vertical tongues; weak coarse subangular blocky structure; friable, firm in place, slightly sticky and slightly plastic; few faint clay films on faces of peds; 2 percent gravel; very strongly acid; clear smooth boundary.

C—53 to 72 inches; mottled brown (7.5YR 5/4), yellowish brown (10YR 5/4), and yellowish red (5YR 5/6) clay loam; massive; friable, slightly sticky and slightly plastic; 10 percent gravel; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock is more than 72 inches. The content of gravel ranges from 0 to 15 percent in the A, E, BE, Bt, and Btg horizons and from 0 to 35 percent in the C and Cg horizons. Reaction ranges from very strongly acid to moderately acid throughout the profile.

The A or Ap horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4.

The E horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 or 4. It is loam or sandy loam.

The BE horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 4 to 6. It is loam or sandy loam.

The upper part of the Bt horizon has a matrix color or mottles with hue of 5YR to 10YR, value of 4 to 6, and chroma of 3 to 8. The lower part of the Bt horizon has a matrix color or mottles with hue of 5YR to 10YR, value of 4 to 6, and chroma of 3 to 6. In some pedons low-chroma mottles are below a depth of 36 inches. The Bt horizon is loam, sandy clay loam, or clay loam.

The Btg horizon, if it occurs, is neutral in hue or has hue of 5YR to 10YR. It has value of 4 to 6 and chroma of 0 to 2. It is loam, sandy clay loam, or clay loam.

The C horizon has a matrix color or mottles with hue

of 5YR to 2.5Y and value and chroma of 3 to 8. It ranges from sandy loam to clay in the fine-earth fraction. Some pedons have low-chroma mottles.

The Cg horizon, if it occurs, is neutral in hue or has hue of 5YR to 2.5Y. It has value of 3 to 8 and chroma of 0 to 2. It ranges from sandy loam to clay in the fine-earth fraction. Most pedons have high-chroma mottles.

Georgeville Series

Soils of the Georgeville series are very deep and are well drained. They formed in residuum derived from fine grained rock, such as Carolina slate, on uplands in the Piedmont physiographic province. Slope ranges from 2 to 25 percent.

Georgeville soils are near Helena, Iredell, Mattaponi, and Roanoke soils. These nearby soils have mottles that are indicative of saturation.

Typical pedon of Georgeville silt loam, 2 to 7 percent slopes, 2.1 miles north of the intersection of Virginia Highways 611 and 624, about 2,995 feet west of Virginia Highway 699 near Trinity Church, in northern Dinwiddie County:

A—0 to 4 inches; dark brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; friable, slightly sticky and nonplastic; few coarse and common fine and medium roots; very strongly acid; clear smooth boundary.

BA—4 to 8 inches; red (2.5YR 4/6) silty clay loam; strong medium and coarse subangular blocky structure; firm, sticky and slightly plastic; few fine and medium roots; strongly acid; clear wavy boundary.

Bt1—8 to 21 inches; red (2.5YR 4/8) clay; strong fine and medium subangular blocky structure; firm, sticky and plastic; few fine and medium roots; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—21 to 51 inches; red (2.5YR 4/8) silty clay; strong fine and medium subangular blocky structure; firm, sticky and plastic; few fine and medium roots; few faint clay films on faces of peds; few fine prominent bodies of highly weathered yellow (10YR 7/8) parent material; strongly acid; gradual smooth boundary.

C—51 to 75 inches; red (2.5YR 4/8) silty clay loam; weak coarse and very coarse subangular blocky structure; firm, sticky and slightly plastic; few fine roots; few fine and medium prominent bodies of highly weathered brownish yellow (10YR 6/8) parent material; strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. The depth to bedrock is more than 60 inches. The content of gravel ranges from 0 to 15 percent in the A and BA horizons, from 0 to 5 percent in the Bt horizon, and from 0 to 10 percent in the BC and C horizons. Some pedons have a few fine flakes of mica in the lower part of the solum. Reaction ranges from very strongly acid to moderately acid in the A horizon and is very strongly acid or strongly acid throughout the rest of the profile.

The A or Ap horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 3 to 8. In eroded areas, the Ap horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8. The A or Ap horizon is generally silt loam. It is mostly clay loam or silty clay loam in eroded areas.

The BA horizon, if it occurs, has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. It is silty clay loam or clay loam.

The Bt horizon has hue of 10R to 5YR, value of 4 or 5, and chroma of 6 to 8. Hue of 5YR occurs only in the upper part of the horizon. In some pedons the lower part of the Bt horizon has yellow or brown mottles. The Bt horizon is clay loam, silty clay loam, silty clay, or clay.

The BC horizon, if it occurs, has hue of 10R to 5YR, value of 4 or 5, and chroma of 6 to 8. In some pedons it has mottles in shades of yellow or brown. It is silt loam, loam, silty clay loam, or clay loam.

The C horizon, if it occurs, has hue of 10R to 10YR, value of 4 to 6, and chroma of 3 to 8. It has common mottles of brown, yellow, gray, or red. The C horizon is silt loam, loam, very fine sandy loam, or fine sandy loam that has as much as 90 percent soft saprolite of fine grained rock, such as Carolina slate.

Helena Series

Soils of the Helena series are very deep and are moderately well drained. They formed in residuum derived from acid crystalline rock on uplands in the Piedmont physiographic province. Slope ranges from 2 to 15 percent.

Helena soils are near Appling, Cecil, Georgeville, Herndon, Iredell, and Roanoke soils. Appling, Cecil, Georgeville, and Herndon soils do not have mottles with chroma of 2 in the upper 30 inches of the profile. Iredell soils have more than 50 percent base saturation. Roanoke soils have mottles with chroma of 2 directly below the A horizon.

Typical pedon of Helena loam, 2 to 7 percent slopes, about 1,200 feet north of the junction of Virginia Highway 40 and Virginia Highway 644, about 240 feet east of Virginia Highway 644, in southwestern Dinwiddie County:

A—0 to 2 inches; grayish brown (10YR 5/2) loam; weak fine granular structure; friable, nonsticky and nonplastic; many fine roots; strongly acid; abrupt smooth boundary.
E—2 to 7 inches; pale brown (10YR 6/3) loam; weak fine granular structure; friable, nonsticky and nonplastic; few fine roots; strongly acid; clear smooth boundary.
BE—7 to 16 inches; brownish yellow (10YR 6/6) sandy clay loam; few fine distinct strong brown (7.5YR 5/8) mottles; weak medium granular structure; friable, slightly sticky and slightly plastic; few fine roots; very strongly acid; clear wavy boundary.
Bt1—16 to 21 inches; pale brown (10YR 6/3) clay loam; common medium faint yellowish brown (10YR 5/8) mottles; weak fine angular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few faint clay films on faces of peds; very strongly acid; clear wavy boundary.
Bt2—21 to 32 inches; yellowish brown (10YR 5/4) clay; common fine distinct gray (10YR 6/1) mottles; moderate medium and coarse angular blocky structure; very firm, sticky and plastic; few fine and medium roots; few faint clay films on faces of peds; very strongly acid; clear wavy boundary.
Bt3—32 to 43 inches; brownish yellow (10YR 6/8) clay; many medium distinct gray (10YR 6/1) and many medium faint reddish yellow (7.5YR 6/8) mottles; weak medium and coarse angular blocky structure; firm, sticky and plastic; few fine roots; few faint clay films on faces of peds; very strongly acid; clear wavy boundary.
BC—43 to 55 inches; very pale brown (10YR 7/3) clay loam; many medium distinct strong brown (7.5YR 5/8) mottles; weak coarse and medium angular blocky structure; very firm, sticky and plastic; common distinct clay films on faces of peds; very strongly acid; clear wavy boundary.
Cg—55 to 72 inches; light gray (10YR 7/1) sandy clay loam saprolite; many medium prominent brownish yellow (10YR 6/8) mottles; massive; friable, firm in place; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. The content of gravel ranges from 0 to 15 percent throughout the profile. Reaction ranges from very strongly acid to moderately acid in the A and E horizons and is very strongly acid or strongly acid throughout the rest of the profile.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4.

The E horizon has hue of 10YR to 5Y, value of 5 to 8, and chroma of 2 to 4. It is loam or sandy loam.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 to 8, and chroma of 3 to 8. It is clay loam or clay.

The BC horizon has hue of 7.5YR to 2.5Y, value of 5 to 8, and chroma of 3 to 8. It is clay loam or sandy clay loam.

The Cg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2. It is mottled in shades of yellow or brown. It is sandy loam, fine sandy loam, loam, sandy clay loam, or clay loam saprolite. The clay loam occurs only as seams or pockets.

Herndon Series

Soils of the Herndon series are very deep and are well drained. They formed in residuum derived from fine grained rock, such as Carolina slate, on uplands in the Piedmont physiographic province. Slope ranges from 2 to 15 percent.

Herndon soils are near Helena, Iredell, Mattaponi, and Roanoke soils. These soils have gray mottles that are indicative of saturation.

Typical pedon of Herndon loam, 2 to 7 percent slopes, 528 feet north of the intersection of Virginia Highways 709 and 692, about 60 feet west of Virginia Highway 709, in southwestern Dinwiddie County:

A—0 to 3 inches; very dark grayish brown (10YR 3/2) loam; weak fine granular structure; friable, nonsticky and nonplastic; many fine and few medium and large roots; very strongly acid; abrupt wavy boundary.
E—3 to 12 inches; brownish yellow (10YR 6/6) loam; weak fine granular structure; friable, nonsticky and nonplastic; few fine, medium, and large roots; 10 percent gravel; very strongly acid; gradual smooth boundary.
Bt1—12 to 21 inches; yellowish brown (10YR 5/8) silty clay loam; moderate fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; few faint clay films on faces of peds; strongly acid; clear wavy boundary.
Bt2—21 to 30 inches; strong brown (7.5YR 5/8) silty clay loam; few fine distinct yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; few faint clay films on faces of peds; 3 percent gravel; very strongly acid; gradual smooth boundary.
Bt3—30 to 38 inches; strong brown (7.5YR 5/8) silty clay loam; many fine and medium distinct red (2.5YR 5/8) mottles; strong medium and coarse subangular blocky structure; firm, slightly sticky and slightly plastic; few fine and medium roots; few faint

clay films on faces of peds; 2 percent gravel; very strongly acid; gradual smooth boundary.

Bt4—38 to 47 inches; reddish yellow (7.5YR 6/8) silty clay loam; common medium distinct red (2.5YR 4/8), few fine faint strong brown (7.5YR 5/8), and few fine prominent very pale brown (10YR 7/3) mottles; moderate fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; 5 percent gravel; very strongly acid; gradual wavy boundary.

C—47 to 72 inches; mottled red (2.5YR 4/8), strong brown (7.5YR 5/8), and white (10YR 8/2) silt loam saprolite; 5 percent gravel; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock is more than 60 inches. The content of gravel ranges from 0 to 15 percent in the A, Ap, and E horizons, from 0 to 5 percent in the Bt and BC horizons, and from 0 to 10 percent in the C horizon. Reaction ranges from very strongly acid to slightly acid in the A, Ap, and E horizons and from extremely acid to strongly acid throughout the rest of the profile.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 2 to 8. If the value is 3, the horizon is less than 6 inches thick.

The E horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6.

The Bt horizon has hue of 5YR to 10YR, value of 4 to 7, and chroma of 4 to 8. In most pedons it has mottles in shades of red and brown.

The C horizon is mottled in shades of red, brown, and white. It is soft, silt loam or loam saprolite of fine grained rock material.

Iredell Series

Soils of the Iredell series are very deep and are moderately well drained. They formed in residuum derived from basic crystalline rock on uplands in the Piedmont physiographic province. Slope ranges from 2 to 15 percent.

Iredell soils are near Georgeville, Helena, Herndon, and Roanoke soils. Georgeville and Herndon soils do not have mottles with chroma of 2. They are very strongly acid or strongly acid in the subsoil. Helena soils have less than 35 percent base saturation. Roanoke soils have mottles with chroma of 2 directly below the A horizon.

Typical pedon of Iredell loam, 2 to 7 percent slopes, about 2.1 miles north of the intersection of Virginia Highways 611 and 624, about 1,500 feet west of Virginia Highway 699, northeast of Trinity Church, in northern Dinwiddie County:

A—0 to 4 inches; grayish brown (2.5Y 5/2) loam; weak medium granular structure; friable, slightly sticky and slightly plastic; many fine and medium roots; 2 percent black concretions; strongly acid; clear smooth boundary.

E—4 to 10 inches; light brownish gray (2.5Y 6/2) loam; moderate medium granular structure; friable, slightly sticky and slightly plastic; common fine and medium roots; strongly acid; clear smooth boundary.

Bt1—10 to 19 inches; yellowish brown (10YR 5/6) clay; moderate medium angular blocky structure; very firm, very sticky and very plastic; few fine and medium roots; few faint clay films on faces of peds; common pressure faces; slightly acid; clear smooth boundary.

Bt2—19 to 26 inches; yellowish brown (10YR 5/6) clay; moderate medium and coarse subangular blocky structure; very firm, very sticky and very plastic; few fine and medium roots; few faint clay films on faces of peds; common pressure faces; common medium rounded feldspar crystals; neutral; gradual wavy boundary.

C1—26 to 30 inches; brownish yellow (10YR 6/8) loam; common medium distinct dark yellowish brown (10YR 4/4) and few medium distinct strong brown (7.5YR 5/8) mottles; massive; friable, slightly sticky and slightly plastic; few fine roots; mildly alkaline; clear smooth boundary.

C2—30 to 38 inches; finely mottled dark greenish gray (5G 4/1), very pale brown (10YR 7/4), and yellowish brown (10YR 5/6) loam saprolite; massive with relict rock-controlled structure; few fine roots; few medium black concretions; mildly alkaline; gradual wavy boundary.

C3—38 to 72 inches; finely mottled dark greenish gray (5G 4/1), very pale brown (10YR 7/4), black (10YR 2/1), and yellowish brown (10YR 5/6) sandy loam saprolite; massive with relict rock-controlled structure; few fine roots; thin continuous vertical black concretions along cleavage planes; moderately alkaline.

The thickness of the solum ranges from 20 to 40 inches. The depth to hard bedrock is more than 60 inches. The content of gravel ranges from 0 to 5 percent in the A and E horizons and from 0 to 15 percent in the Bt and C horizons. The content of iron and manganese concretions ranges from 0 to 10 percent throughout the profile. The Bt horizon has few to common slickensides or pressure faces. Reaction ranges from strongly acid to neutral in the A and E horizons, from moderately acid to neutral in the Bt horizon, and from neutral to mildly alkaline in the C horizon.

The A horizon has hue of 10YR to 5Y, value of 4 or 5, and chroma of 2 to 4.

The E horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 1 to 3. It is fine sandy loam, silt loam, or loam.

The Bt horizon has hue of 10YR to 2.5Y, value of 4 or 5, and chroma of 4 to 6.

The C horizon is mottled in shades of brown, yellow, black, white, or gray. It is sandy loam, loam, or sandy clay loam saprolite.

Mattaponi Series

Soils of the Mattaponi series are very deep and are moderately well drained. They formed in fluvial and marine sediments on uplands in the Coastal Plain province and in fluvial and colluvial sediments capping acid crystalline rock residuum in the Piedmont physiographic province. Slope ranges from 0 to 10 percent.

Mattaponi soils are near Appling, Cecil, Georgeville, and Herndon soils in the Piedmont physiographic province and are near Emporia, Nansemond, Roanoke, and Slagle soils in the Coastal Plain physiographic province. Appling, Cecil, Georgeville, and Herndon soils do not have mottles that are indicative of saturation. Emporia, Nansemond, and Slagle soils have less than 35 percent clay in the subsoil. Roanoke soils have mottles with chroma of 2 directly below the A horizon.

Typical pedon of Mattaponi sandy loam, 2 to 6 percent slopes, 2,760 feet west of the intersection of Virginia Highways 601 and 708, about 880 feet north of Virginia Highway 708, in northern Dinwiddie County:

A—0 to 2 inches; very dark grayish brown (10YR 3/2) sandy loam; weak fine granular structure; friable, nonsticky and nonplastic; many fine and medium roots; few uncoated sand grains; strongly acid; abrupt smooth boundary.

E—2 to 13 inches; yellowish brown (10YR 5/6) sandy loam; weak medium granular structure; friable, slightly sticky and nonplastic; many fine and medium roots; 4 percent gravel; very strongly acid; clear wavy boundary.

Bt1—13 to 19 inches; strong brown (7.5YR 5/8) clay loam; weak fine and medium subangular blocky structure; friable, sticky and slightly plastic; common fine and medium roots; 5 percent gravel; very strongly acid; gradual smooth boundary.

Bt2—19 to 29 inches; strong brown (7.5YR 5/8) clay; weak fine and medium subangular blocky structure; friable, sticky and plastic; few medium roots; few faint clay films on faces of peds; 5 percent gravel; very strongly acid; gradual smooth boundary.

Bt3—29 to 37 inches; strong brown (7.5YR 5/8) clay; few fine and medium distinct brownish yellow (10YR 6/8) and few fine prominent red (2.5YR 4/8) mottles; weak coarse angular blocky structure parting to weak fine and medium subangular blocky; friable, slightly sticky and slightly plastic; few faint clay films on faces of peds; 10 percent gravel; strongly acid; gradual wavy boundary.

Bt4—37 to 46 inches; strong brown (7.5YR 5/8) clay; weak thick and medium platy structure parting to weak fine and medium angular blocky; firm in place, friable when removed; slightly sticky and slightly plastic; 10 percent gravel; strongly acid; gradual wavy boundary.

BC—46 to 72 inches; mottled strong brown (7.5YR 5/8), brownish yellow (10YR 6/8), reddish yellow (7.5YR 6/8), and very pale brown (10YR 8/3) clay; weak thick and medium platy structure parting to weak fine and medium angular blocky; very firm in place, firm when removed; slightly sticky and slightly plastic; 10 percent gravel; strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. The depth to bedrock is more than 60 inches. The content of gravel ranges from 0 to 15 percent in the A and E horizons, from 0 to 35 percent in the BE, Bt, and BC horizons, and from 0 to 50 percent in the C horizon. Some pedons have stone lines in the lower part of the solum and in the C horizon. Reaction is very strongly acid or strongly acid throughout the profile.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 3 to 7, and chroma of 2 to 8.

The E horizon has hue of 5YR to 2.5Y, value of 2 to 7, and chroma of 2 to 8. It is sandy loam, loam, or sandy clay loam.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 8, and chroma of 3 to 8. In some pedons the lower part of the Bt horizon has high- and low-chroma mottles. The Bt horizon is sandy clay, clay loam, or clay in the fine-earth fraction.

The BC horizon is mottled and has hue of 7.5YR to 2.5Y, value of 4 to 8, and chroma of 3 to 8. It is sandy clay, clay loam, or clay in the fine-earth fraction.

The C horizon, if it occurs, is mottled and has hue of 7.5YR to 2.5Y, value of 4 to 8, and chroma of 3 to 8. It is sandy loam, clay loam, or loam in the fine-earth fraction.

Myatt Series

Soils of the Myatt series are very deep and are poorly drained. They formed in fluvial and marine sediments on stream terraces and upland flats of the Coastal Plain physiographic province. Slope ranges from 0 to 2 percent.

Myatt soils are near Nansemond, Roanoke, Slagle, and Uchee soils. Nansemond, Slagle, and Uchee soils have mottles with chroma of 2 at a lower depth than those in the Myatt soils. Roanoke soils have more than 35 percent clay in the subsoil.

Typical pedon of Myatt silt loam, 0 to 2 percent slopes, occasionally flooded, 550 feet west of the intersection of Virginia Highways 670 and 693, about 50 feet south of Virginia Highway 693, in eastern Dinwiddie County:

A—0 to 4 inches; dark gray (10YR 4/1) silt loam; many medium faint very dark grayish brown (10YR 3/2) mottles; weak fine granular structure; friable, slightly sticky and slightly plastic; many fine and medium roots; very strongly acid; clear wavy boundary.

Eg—4 to 7 inches; light gray (10YR 6/1) loam; common medium prominent brownish yellow (10YR 6/6) and few fine prominent yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; few fine tubular pores; very strongly acid; clear smooth boundary.

BEg—7 to 13 inches; light brownish gray (10YR 6/2) loam; common medium distinct brownish yellow (10YR 6/6) and few fine prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; few fine tubular pores; 1 percent gravel; very strongly acid; gradual wavy boundary.

Btg—13 to 42 inches; light gray (10YR 6/1) sandy clay loam; many coarse prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/6) mottles; weak fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; common fine tubular pores; few faint clay films on faces of peds and in root channels; 1 percent gravel; very strongly acid; gradual irregular boundary.

Cg—42 to 72 inches; light gray (10YR 6/1) sandy clay loam; common medium distinct yellowish brown (10YR 5/6) and common fine prominent strong brown (7.5YR 5/6) mottles; massive; friable, slightly sticky and slightly plastic; few fine and medium roots; common fine tubular pores; 5 percent gravel; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock is more than 60 inches. The content of gravel ranges from 0 to 3 percent in the A, Eg, BEg, and Btg horizons and from 5 to 25 percent in the Cg horizon. Reaction ranges from very strongly acid to moderately acid in the A and E horizons and from extremely acid to strongly acid throughout the rest of the profile.

The A horizon has hue of 10YR, value of 3 to 6, and chroma of 1 or 2.

The Eg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is loam or silt loam.

The BEg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It is loam or silt loam.

The Btg horizon is neutral in hue or has hue of 10YR to 5Y. It has value of 6 or 7 and chroma of 0 or 1. It is mottled in shades of brown and yellow. It is sandy clay loam, loam, or clay loam.

The Cg horizon is neutral in hue or has hue of 10YR to 5Y. It has value of 6 or 7 and chroma of 0 or 1. It is mottled in shades of brown and yellow. It is sandy clay loam or clay loam in the fine-earth fraction.

Nansemond Series

Soils of the Nansemond series are very deep and are moderately well drained. They formed in fluvial and marine sediments on stream terraces in the Coastal Plain physiographic province. Slope ranges from 2 to 10 percent.

Nansemond soils are near Emporia, Mattaponi, Myatt, Roanoke, and Slagle soils. These nearby soils have more than 15 percent clay. Emporia soils have mottles with chroma of 2 below a depth of 36 inches. Myatt and Roanoke soils have mottles with chroma of 2 above a depth of 10 inches.

Typical pedon of Nansemond sandy loam, 6 to 10 percent slopes, about 1.4 miles west of the intersection of Virginia Highways 734 and 626, about 1,580 feet north of Virginia Highway 734, in southeastern Dinwiddie County:

A—0 to 8 inches; grayish brown (10YR 5/2) sandy loam; weak fine granular structure; very friable, nonsticky and nonplastic; many fine and medium roots; 1 percent gravel; strongly acid; abrupt smooth boundary.

BE—8 to 14 inches; brown (10YR 5/3) sandy loam; weak medium subangular blocky structure; very friable, nonsticky and nonplastic; common fine roots and pores; 2 percent gravel; strongly acid; gradual wavy boundary.

Bt1—14 to 19 inches; pale brown (10YR 6/3) sandy loam; common medium faint light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable, slightly sticky and nonplastic; common fine roots and pores; few faint clay films on faces of peds; 4 percent gravel; strongly acid; gradual wavy boundary.

Bt2—19 to 25 inches; very pale brown (10YR 7/3)

sandy loam; common medium faint light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable, slightly sticky and nonplastic; few fine roots; few faint clay films on faces of peds; 5 percent gravel; very strongly acid; gradual wavy boundary.

Bt3—25 to 30 inches; very pale brown (10YR 7/3) sandy loam; common medium distinct light gray (10YR 7/2) mottles; weak medium subangular blocky structure; friable, slightly sticky and nonplastic; few fine roots; few faint clay films on faces of peds; 4 percent gravel; very strongly acid; clear wavy boundary.

Bt4—30 to 35 inches; light yellowish brown (10YR 6/4) sandy loam; few medium distinct light gray (10YR 7/2) mottles; weak coarse subangular blocky structure; very friable, nonsticky and nonplastic; few faint clay films on faces of peds; 3 percent gravel; strongly acid; clear smooth boundary.

BC1—35 to 41 inches; light yellowish brown (10YR 6/4) loamy sand; many coarse distinct light gray (10YR 7/2) mottles; weak coarse subangular blocky structure; very friable, nonsticky and nonplastic; 5 percent gravel; strongly acid; clear smooth boundary.

BC2—41 to 49 inches; very pale brown (10YR 7/3) loamy sand; common coarse distinct brownish yellow (10YR 6/6) mottles; weak coarse subangular blocky structure; friable, nonsticky and nonplastic; 5 percent gravel; strongly acid; abrupt smooth boundary.

C—49 to 72 inches; light yellowish brown (10YR 6/4) sandy clay loam; many coarse distinct light gray (10YR 7/1) and common medium distinct yellowish brown (10YR 5/6) mottles; massive; very firm; 2 percent gravel; extremely acid.

The thickness of the solum ranges from 35 to 60 inches. The depth to bedrock is more than 60 inches. The content of gravel ranges from 0 to 5 percent in the A, BE, Bt, and BC horizons and from 0 to 15 percent in the C and Cg horizons. Reaction ranges from extremely acid to strongly acid throughout the profile.

The A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3. It is sandy loam or fine sandy loam.

The BE horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6. It is sandy loam or fine sandy loam.

The upper part of the Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 6. Few to many high- and low-chroma mottles commonly are below the upper 10 inches of the Bt horizon. The lower part of the Bt horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 3 to 8 or is mottled and does not have a dominant matrix hue. The Bt horizon is sandy loam or fine sandy loam. Some pedons have a thin subhorizon of loam or sandy clay loam.

The BC horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 3 to 8 or is mottled and does not have a dominant matrix hue. The BC horizon is loamy sand or loamy fine sand.

The C horizon is neutral in hue or has hue of 7.5YR to 5Y, value of 4 to 8, and chroma of 0 to 8, or it is mottled and does not have a dominant matrix hue. It is loamy sand or sandy clay loam.

The Cg horizon, if it occurs, is neutral in hue or has hue of 7.5YR to 5Y. It has value of 4 to 8 and chroma of 0 to 2. It is loamy sand or sandy clay loam.

Roanoke Series

Soils of the Roanoke series are very deep and are poorly drained. They formed in fluvial sediments on flood plains and terraces in the Coastal Plain and Piedmont physiographic provinces. Slope ranges from 0 to 2 percent.

Roanoke soils are near Altavista, Appling, Cecil, Emporia, Georgeville, Helena, Herndon, Iredell, Mattaponi, Myatt, Nansemond, Slagle, State, and Uchee soils. Except for the Myatt soils, all of these nearby soils do not have gray mottles in the subsurface layer. Myatt soils have less than 35 percent clay in the subsoil.

Typical pedon of Roanoke loam, 0 to 2 percent slopes, occasionally flooded, 600 feet south of the administration building at Petersburg Municipal Airport, in northeastern Dinwiddie County:

A—0 to 4 inches; very dark gray (10YR 3/1) loam; weak fine granular structure; friable; many fine and medium roots; strongly acid; clear smooth boundary.

Eg—4 to 8 inches; grayish brown (10YR 5/2) loam; common medium faint very dark grayish brown (10YR 3/2) and few very fine distinct dark yellowish brown (10YR 4/6) mottles; weak medium subangular blocky structure; friable; common fine and medium roots; strongly acid; clear smooth boundary.

BEg—8 to 15 inches; grayish brown (10YR 5/2) clay loam; common medium prominent yellowish brown (10YR 5/8) and few fine prominent yellowish red (5YR 4/6) mottles; moderate fine and medium subangular blocky structure; friable, slightly sticky and plastic; few fine and medium roots; few faint clay films on faces of peds in the lower part; very strongly acid; clear wavy boundary.

Btg—15 to 40 inches; gray (10YR 5/1) clay; common

medium prominent yellowish brown (10YR 5/8) mottles; moderate fine and medium subangular blocky structure; firm, slightly sticky and plastic; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

BCg—40 to 52 inches; gray (10YR 5/1) clay; many coarse prominent strong brown (7.5YR 5/6) mottles; weak fine and medium subangular blocky structure; friable, slightly sticky and plastic; very strongly acid; gradual wavy boundary.

Cg—52 to 72 inches; gray (10YR 5/1) clay; many coarse prominent strong brown (7.5YR 5/6) mottles; massive; friable, slightly sticky and slightly plastic; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock is more than 60 inches. The content of gravel ranges from 0 to 10 percent throughout the profile. Reaction ranges from extremely acid to strongly acid.

The A horizon is neutral in hue or has hue of 10YR to 5Y. It has value of 2 to 6 and chroma of 0 to 2. If the value is 2 or 3, the horizon is less than 6 inches thick.

The E horizon is neutral in hue or has hue of 10YR to 5Y. It has value of 5 or 6 and chroma of 0 to 2. It is silt loam, loam, or silty clay loam.

The BE horizon is neutral in hue or has hue of 10YR to 5Y. It has value of 5 to 7 and chroma of 0 to 2. It is silt loam, loam, silty clay loam, or clay loam.

The Btg horizon is neutral in hue or has hue of 10YR to 5Y. It has value of 4 to 6 and chroma of 0 to 2. In most pedons it has high-chroma mottles. It is clay, silty clay, silty clay loam, or clay loam.

The BCg horizon is neutral in hue or has hue of 10YR to 5Y. It has value of 4 to 7 and chroma of 0 to 2. In most pedons it has high-chroma mottles. It is clay loam, silty clay loam, or clay.

The Cg horizon is variable in color and texture. It is clay loam, silty clay loam, clay, or sandy clay loam. In some pedons it is stratified and ranges from sand to clay in the fine-earth fraction.

Slagle Series

Soils of the Slagle series are very deep and are moderately well drained. They formed in fluvial and marine sediments on uplands in the Coastal Plain physiographic province. Slope ranges from 0 to 25 percent.

Slagle soils are near Emporia, Mattaponi, Myatt, Nansemond, Roanoke, and Uchee soils. Emporia and Uchee soils do not have mottles with chroma of 2 above a depth of 36 inches. Myatt and Roanoke soils have mottles with chroma of 2 above a depth of 10 inches. Mattaponi soils have more than 35 percent clay in the subsoil. Nansemond soils have less than 18 percent clay in the subsoil.

Typical pedon of Slagle sandy loam, 0 to 2 percent slopes, about 1,300 feet south and 750 feet west of the intersection of Virginia Highways 693 and 670, about 50 feet south of a logging road, in eastern Dinwiddie County:

A—0 to 4 inches; brown (10YR 5/3) sandy loam; weak medium subangular blocky structure; friable, nonsticky and nonplastic; common fine and few medium roots; very strongly acid; clear smooth boundary.

E—4 to 9 inches; pale brown (10YR 6/3) sandy loam; weak medium subangular blocky structure; friable, nonsticky and nonplastic; common fine and few medium roots; very strongly acid; clear wavy boundary.

BE—9 to 14 inches; light yellowish brown (10YR 6/4) sandy loam; weak medium subangular blocky structure; friable, nonsticky and nonplastic; few fine and medium roots; very strongly acid; clear wavy boundary.

Bt1—14 to 24 inches; yellowish brown (10YR 5/4) sandy clay loam; few medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; few faint clay films on faces of peds; 5 percent gravel; very strongly acid; gradual smooth boundary.

Bt2—24 to 30 inches; light olive brown (2.5Y 5/4) sandy clay loam; common medium prominent reddish brown (5YR 4/4) and common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few faint clay films on faces of peds; 2 percent gravel; very strongly acid; gradual smooth boundary.

Bt3—30 to 44 inches; yellowish brown (10YR 5/6) sandy clay loam; many medium distinct light brownish gray (10YR 6/2) and few medium prominent yellowish red (5YR 4/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

C—44 to 72 inches; mottled yellowish brown (10YR 5/6), light brownish gray (10YR 6/2), and yellowish red (5YR 4/6) sandy loam; massive; friable, slightly sticky and slightly plastic; few fine roots; few vertical light brownish gray (10YR 6/2) tongues of loamy sand; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock is more than 60 inches.

The content of gravel ranges from 0 to 5 percent in the A, Ap, E, BE, Bt, and Btg horizons and from 0 to 15 percent in the C horizon. Reaction ranges from extremely acid to strongly acid throughout the profile.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 2 to 6, and chroma of 2 to 4. If the value is 2 or 3, the horizon is less than 6 inches thick.

The E horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 or 4. It is sandy loam or loam.

The BE horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 3 to 6. It is sandy loam or loam.

The upper part of the Bt horizon has hue of 5YR to 10YR, value of 5 to 7, and chroma of 3 to 8. It commonly has high-chroma mottles. The lower part of the Bt horizon has hue of 7.5YR to 5Y, value of 4 to 7, and chroma of 3 to 8 or is mottled in shades of red, brown, yellow, and gray and does not have a dominant matrix color. The Bt horizon is dominantly sandy clay loam or clay loam. In some pedons it has clay in the lower part.

The Btg horizon, if it occurs, has hue of 7.5YR to 5Y, value of 4 to 7, and chroma of 1 or 2. It is sandy clay loam or clay loam. In some pedons it has clay in the lower part.

The C horizon is mottled in shades of red, yellow, brown, and gray. It ranges from sandy loam to clay loam.

State Series

Soils of the State series are very deep and are well drained. They formed in fluvial sediments on stream terraces in the Coastal Plain and Piedmont physiographic provinces. Slope ranges from 0 to 2 percent.

State soils are near Altavista and Roanoke soils. Altavista and Roanoke soils have mottles with chroma of 2 within a depth of 36 inches.

Typical pedon of State fine sandy loam, 0 to 2 percent slopes, occasionally flooded, about 4,000 feet east of the intersection of Virginia Highways 681 and 680, in southeastern Dinwiddie County:

Ap—0 to 8 inches; brown (10YR 5/3) fine sandy loam; weak medium granular structure; very friable; common fine roots; strongly acid; abrupt smooth boundary.

BE—8 to 13 inches; light yellowish brown (10YR 6/4) sandy clay loam; weak fine subangular blocky structure; friable; few fine roots and flakes of mica; strongly acid; clear smooth boundary.

Bt1—13 to 20 inches; yellowish brown (10YR 5/6) sandy clay loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots and flakes of mica; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—20 to 35 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots and flakes of mica; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt3—35 to 42 inches; brownish yellow (10YR 6/6) sandy loam; common faint light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable, nonsticky and nonplastic; few fine flakes of mica; strongly acid; clear smooth boundary.

C—42 to 72 inches; brownish yellow (10YR 6/6) sandy loam; common fine faint light yellowish brown (10YR 6/4) mottles; massive; friable; few fine flakes of mica; 14 percent gravel; very strongly acid.

The thickness of the solum ranges from 35 to 60 inches. The depth to bedrock is more than 60 inches. The content of gravel ranges from 0 to 2 percent in the Ap, BE, and Bt horizons and from 0 to 15 percent in the C horizon. Reaction ranges from extremely acid to strongly acid in the Ap, BE, and Bt horizons and from extremely acid to slightly acid in the C horizon.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 6. If the value is 3, the horizon is less than 6 inches thick.

The BE horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. It is sandy clay loam, fine sandy loam, or sandy loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. The lower part of the Bt horizon is mottled in shades of brown, yellow, and red. The Bt horizon is sandy loam, sandy clay loam, or clay loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 2 to 8. It is generally mottled in shades of brown, red, yellow, olive, and gray. It is sandy loam or loamy sand.

Uchee Series

Soils of the Uchee series are very deep and are well drained. They formed in fluvial and marine sediments on uplands in the Coastal Plain physiographic province. Slope ranges from 0 to 10 percent.

Uchee soils are near Emporia, Myatt, Roanoke, and Slagle soils. Emporia soils have thinner combined A and E horizons than the Uchee soils. Myatt, Roanoke, and Slagle soils have mottles with chroma of 2 within a depth of 36 inches.

Typical pedon of Uchee loamy sand, 0 to 6 percent

slopes, about 1,600 feet south of the intersection of Virginia Highways 667 and 688, about 4,600 feet east of Virginia Highway 667, about 50 feet south of a field boundary, in southeastern Dinwiddie County:

Ap—0 to 9 inches; grayish brown (10YR 5/2) loamy sand; weak medium granular structure; very friable, nonsticky and nonplastic; many medium and fine roots; very strongly acid; clear smooth boundary.
E—9 to 32 inches; light yellowish brown (10YR 6/4) loamy sand; weak medium granular structure; friable, nonsticky and nonplastic; few fine and medium roots; many fine tubular pores; few fine uncoated sand grains; very strongly acid; clear wavy boundary.
Bt—32 to 46 inches; yellowish brown (10YR 5/6) sandy clay loam; few medium distinct brown (7.5YR 5/4) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common distinct clay films on faces of peds; strongly acid; gradual wavy boundary.
C—46 to 72 inches; mottled yellowish brown (10YR 5/6), red (2.5YR 4/6), brown (10YR 5/3), and light brownish gray (10YR 6/2) sandy clay loam; massive; friable, firm in place; few fine roots and tubular pores; strongly acid.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock is more than 60 inches. The content of gravel ranges from 0 to 15 percent in the A, Ap, E, and Bt horizons and from 0 to 10 percent in the C horizon. Reaction is very strongly acid or strongly acid throughout the profile.

The A or Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4.

The E horizon has hue of 10YR and value and chroma of 4 to 6. It is loamy sand or sand.

The Bt horizon has hue of 10YR, value of 5 to 7, and chroma of 4 to 8. It is sandy loam or sandy clay loam.

The C horizon is mottled in shades of yellow, brown, red, or gray. It is sandy loam or sandy clay loam.

Udorthents

Udorthents range from shallow to very deep and from well drained to somewhat poorly drained. These soils formed in residuum on uplands in the Piedmont physiographic province and in fluvial and marine sediments on uplands in the Coastal Plain physiographic province. Slope ranges from 0 to 25 percent.

Udorthents are near Appling, Cecil, Mattaponi, and Roanoke soils.

Because of the variability of the Udorthents, a typical profile is not described. The depth to bedrock ranges from 10 to more than 60 inches. The content of gravel ranges from 0 to 75 percent throughout the profile. Reaction ranges from extremely acid to moderately alkaline throughout the profile.

The A horizon has hue of 2.5YR to 2.5Y, value of 4 to 8, and chroma of 3 to 8. It ranges from sandy loam to clay in the fine-earth fraction.

The upper part of the C horizon has hue of 2.5YR to 2.5Y and value and chroma of 3 to 8. The lower part is neutral in hue or has hue of 2.5YR to 5Y. It has value of 3 to 8 and chroma of 0 to 8. The upper part of the C horizon ranges from sandy loam to clay in the fine-earth fraction. The lower part ranges from sand to clay in the fine-earth fraction.

Formation of the Soils

This section describes the factors that have affected the formation of the soils in the survey area. It also describes the major processes in the development of soil horizons.

Factors of Soil Formation

Soil forms through weathering and other processes that act on parent material. The characteristics of a soil depend upon the interaction of parent material, climate, plants and animals, relief, and time.

Climate and plants and animals are the active forces of soil formation. They act on the parent material that has accumulated through the deposition of sediments and slowly change it into soil. Although all five factors affect the formation of every soil, the relative importance of each differs from place to place. In extreme cases one factor dominates soil formation and determines most of the soil properties. In general, however, the combined action of the five factors determines the characteristics of each soil.

Parent Material

Parent material is the unconsolidated material in which a soil forms. It is largely responsible for the chemical and mineralogical composition of the soil and the rate of the soil-forming processes.

The two most common types of parent material in the survey area are unconsolidated sediments deposited by fluvial and marine action and materials that weathered in place from igneous and metamorphic rock.

The parent material in the eastern part of the survey area is alluvial. It was transported and deposited by marine and fluvial action. Deposition occurred at different geologic times, and the sediments from different sources were combined.

The largest and oldest depositional areas in the survey area consist of upland rises at the higher elevations. The loamy Emporia and Slagle soils and the clayey Mattaponi soils formed in these sediments.

Recent depositional areas are associated with rivers and streams where sediments are deposited by floodwater. The loamy Altavista and Nansemond soils on stream terraces and the clayey Roanoke soils on flood plains formed in these sediments.

In the western part of the survey area, the parent material is mainly residual material that weathered in place from the underlying bedrock. The characteristics of the residual parent material are directly related to the underlying bedrock.

Igneous rocks formed as molten rock material cooled and became solidified. Examples of igneous rocks include granite and diabase.

Metamorphic rocks formed as pre-existing rocks were altered by heat and pressure. Examples of metamorphic rocks include granite gneiss, hornblende gneiss, mica gneiss, sericite schist, and mica schist.

Igneous and metamorphic rocks are also classified as acidic or basic, depending on the type and amount of minerals in the rock. Basic rock commonly contains some calcium, which is not present in acidic rock.

Granite, granite gneiss, mica gneiss, mica schist, and sericite schist are acidic rocks that weathered to form the parent material for the Appling, Cecil, Georgeville, Helena, and Herndon soils. Reaction in these soils commonly is very strongly acid or strongly acid.

Basic rock, such as diabase and hornblende gneiss, weathered to form the parent material for the Iredell soils. Reaction in these soils commonly is moderately acid to moderately alkaline.

Climate

Precipitation and temperature are the main climatic factors that influence soil formation. Water dissolves minerals, promotes biological activity, and transports mineral and organic residue through the soil. Temperature determines the types of physical, chemical, and biological activities that take place in the soil and the speed at which they act.

Precipitation causes the downward leaching of lime, free carbonates, and other soluble minerals from upland soils and thus influences the physical and chemical characteristics of soils. Water percolating through the soil moves clay from the surface layer to the subsoil. The soils in the survey area typically have a subsoil that contains more clay than the surface layer. Some

exceptions are soils that formed in recent alluvium, in sand, or on very steep slopes. Alluvial areas are recharged with sediments from surrounding eroded uplands.

Climate also influences the formation of blocky structure in the subsoil of well developed soils. The development of peds, or aggregates, in the subsoil occurs because the volume of the soil changes as a result of alternating cycles of wetting and drying.

Plant and Animal Life

Plants and animals, micro-organisms, and humans have had an important role in the formation of soils. Plants are generally responsible for the content of organic matter in the soil, the color of the surface layer, and the amount of plant nutrients in the soil. Micro-organisms, earthworms, cicadas, and burrowing animals decompose and mix the organic matter, thus releasing plant nutrients. The rate of decomposition is fairly rapid because of favorable temperatures and an abundant amount of moisture.

Native vegetation was the major living organism affecting soil formation before humans settled in the survey area. The original forest cover consisted of mixed pines and hardwoods. Hardwoods return more calcium and phosphorus to the soil through the loss of leaves than coniferous trees. Thus, the soils in the survey area are not as leached of calcium and phosphorus as they would be if they had formed under a pine forest cover.

Human activities, including the clearing of forests, the introduction of new plants, cultivation, artificial drainage, and applications of lime and fertilizer, have influenced soil formation. In some areas human activities have accelerated soil erosion, thus removing nutrients, organic matter, and much of the original surface layer.

Relief

Relief affects the formation of soils by influencing the amount of water infiltration, the rate of runoff, soil drainage, soil temperature, and geologic erosion. It can also affect the amount of radiant energy absorbed by the soils, thus affecting the type of native vegetation. It can alter the effects of parent material to such an extent that several different kinds of soils can form from the same kind of parent material.

Relief is largely determined by the underlying geologic formations and by the dissection of landforms by rivers and streams. Relief in the survey area ranges from nearly level to moderately steep.

The nearly level soils are on upland flats and flood plains and in swamps and marshes. Areas of nearly level soils are wet and are often ponded or flooded. Drainage in areas of these soils is restricted. The soils have a seasonal high water table that is close to the surface. Surface runoff is usually slow. The soils are gray or mottled because of the excess water. Roanoke soils are examples of nearly level soils.

The gently sloping to very steep soils are generally well drained or moderately well drained. In gently sloping and sloping areas, geologic erosion is slight, surface runoff is medium or rapid, and water infiltration is optimum. The translocation of bases and clay has occurred downward through the soil. The soils in gently sloping and sloping areas are mature and have well defined horizons. Appling and Cecil soils are examples. In the steeper areas, surface runoff is very rapid, the amount of water infiltration and the translocation of bases and clay through the soil are reduced, and the erosion potential is high. Soils that formed in these areas have weakly expressed horizons.

In upland areas where natural stream dissection has not created drainage outlets, the soils are moderately well drained. The relief has modified the effects of the other soil-forming factors in these areas. For example, Emporia and Slagle soils formed in a similar parent material. The Emporia soils are higher on the landscape than the Slagle soils and are well drained. The Slagle soils are in the lower landscape positions and are moderately well drained.

Time

Time influences the degree of development of a soil or the degree of horizon differentiation in a soil. Soils that have little or no horizon development are considered young, or immature, and soils that have strongly developed horizons are considered old, or mature. Many soils range in maturity between these two stages.

The oldest soils in the survey area are those that formed on well drained uplands at the higher elevations. These soils, such as Appling, Cecil, and Emporia soils, have a strong degree of horizon differentiation. Other soils, such as Altavista, Nansemond, and Roanoke soils, formed in recent alluvium and have been in place only a relatively short geologic time. They show little or no horizon development, are commonly stratified, and have an irregular distribution of organic matter in the profile.

Processes of Soil Formation

Soils form as a result of physical and chemical weathering of rock, decomposition and accumulation of organic matter, leaching of soluble salts, reduction and transfer of iron, and the formation and translocation of clay minerals. These processes continuously act on soils.

Soil formation begins with the physical weathering of

rock. In this survey area, large rocks were broken into smaller pieces by frost action and by other forces. The rocks and rock fragments were further reduced to sand- and silt-sized particles, which were transported and deposited by ancient seas and rivers in the eastern part of the survey area. In the western part of the survey area, the rock and rock fragments remained in place, forming an unconsolidated layer of material that supports plants. Plants and animals, when they die, add organic matter to the mineral matter.

Rock fragments and organic matter are chemically weathered by solution, carbonation, oxidation, reduction, and the action of weak acids. Such processes release iron, aluminum, calcium, and other compounds that can be used by plants.

The transfer of material from one part of the soil to another is common in most soils. Because it is suspended in solution, organic matter can move throughout the soil. Calcium and other compounds are leached from the surface layer. In some instances these compounds are held by the clay in the subsoil, but some compounds are leached out of the soil.

The translocation and the development in place of clay minerals have strongly influenced the development of soil horizons in the survey area. As the soil matures, horizons gradually develop recognizable characteristics that distinguish one layer from another.

Morphology of the Soils

The results of the soil-forming factors are evidenced by the different layers, or horizons, in a soil profile. The profile extends from the surface downward to material that is little altered by the soil-forming processes.

Most mature soils contain three major horizons, which are called the A, B, and C horizons. These horizons may be further subdivided by the use of subscripts and letters to indicate changes within a horizon. For example, a Bt2 horizon indicates a subhorizon in the Bt horizon that contains translocated clay from the A horizon.

The A horizon is commonly called the surface layer. It has the largest accumulation of organic matter. If considerable leaching has taken place, an E horizon is formed below the A horizon.

The E horizon is the zone of maximum leaching, or eluviation, of clay and iron. It has a light color resulting from the loss of these materials. Some soils in the survey area do not have an E horizon.

The B horizon underlies the A or E horizon and is commonly called the subsoil. It is the zone of maximum accumulation, or illuviation, of clay, iron, aluminum, or other compounds that are leached from the A or E horizon. In some soils the B horizon forms through alteration of the soil material in place with very little illuviation. The alteration may be caused by the oxidation and the reduction of iron or by the weathering of clay minerals. The B horizon is generally firmer and has a finer texture, a stronger structure, and darker or redder colors than the E horizon. Most young soils do not have a B horizon.

The C horizon is below the B horizon or is below the A horizon in soils that do not have a B horizon. It consists of material that is little altered by the soil-forming processes but that may be modified by weathering.

References

(1) American Association of State Highway and Transportation Officials. 1986. Standard specifications for highway materials and methods of sampling and testing. Ed. 14, 2 vols.

(2) American Society for Testing and Materials. 1993. Standard classification of soils for engineering purposes. ASTM Stand. D 2487.

(3) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436.

(4) United States Department of Agriculture. 1993. Soil survey manual. U.S. Dep. Agric. Handb. 18.

Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly

have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop

grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Igneous rock. Rock formed by the cooling and solidification of molten rock material. Examples of igneous rocks are granite and diabase.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by the wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 drawbar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then

multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the substratum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). A layer of otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the

earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1973-93 at Fort Pickett, Virginia)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	46.9	23.5	35.2	72	-1	60	4.14	2.32	5.76	7	3.5
February	51.0	25.4	38.2	77	3	98	3.21	1.82	4.44	6	4.2
March	59.7	33.1	46.4	85	13	246	4.32	2.41	6.02	7	1.2
April	69.8	41.3	55.6	91	20	473	3.48	1.69	5.03	6	.0
May	77.6	50.9	64.3	92	33	748	3.98	2.70	5.16	6	.0
June	84.8	59.5	72.2	97	42	961	3.36	1.81	4.72	6	.0
July	88.9	64.8	76.8	100	49	1,129	4.63	2.16	6.76	6	.0
August	87.2	63.3	75.2	99	47	1,074	4.46	2.32	6.34	7	.0
September	81.3	56.2	68.7	96	38	854	3.68	1.61	5.44	5	.0
October	70.4	42.6	56.5	88	24	513	3.69	1.98	5.19	5	.0
November	61.7	35.0	48.4	81	15	278	3.37	1.81	4.75	5	.1
December	50.6	26.5	38.5	74	4	102	3.44	1.97	4.75	6	1.4
Yearly:											
Average	69.2	43.5	56.3	---	---	---	---	---	---	---	---
Extreme	---	---	---	101	-4	---	---	---	---	---	---
Total	---	---	---	---	---	6,538	45.76	39.45	51.85	72	10.4

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1973-93 at Fort Pickett, Virginia)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 12	Apr. 22	May 4
2 years in 10 later than--	Apr. 7	Apr. 17	Apr. 30
5 years in 10 later than--	Mar. 27	Apr. 9	Apr. 21
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 24	Oct. 10	Oct. 1
2 years in 10 earlier than--	Oct. 30	Oct. 16	Oct. 6
5 years in 10 earlier than--	Nov. 10	Oct. 28	Oct. 15

TABLE 3.--GROWING SEASON

(Recorded in the period 1973-93 at Fort Pickett, Virginia)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	203	178	154
8 years in 10	211	186	161
5 years in 10	227	201	175
2 years in 10	243	216	189
1 year in 10	252	224	197

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Dinwiddie County	City of Petersburg	City of Colonial Heights	Total-- Area	Extent
		Acres	Acres	Acres	Acres	Pct
1A	Altavista fine sandy loam, 0 to 2 percent slopes, occasionally flooded	485	0	0	485	0.1
1B	Altavista fine sandy loam, 2 to 6 percent slopes, occasionally flooded	133	0	0	133	*
2B	Appling sandy loam, 2 to 7 percent slopes	53,421	384	293	54,098	16.4
2C	Appling sandy loam, 7 to 15 percent slopes	28,443	424	188	29,055	8.8
2D	Appling sandy loam, 15 to 25 percent slopes	1,310	494	98	1,902	0.6
3B	Appling-Urban land complex, 0 to 7 percent slopes	0	1,795	440	2,235	0.7
3C	Appling-Urban land complex, 7 to 15 percent slopes	544	128	0	672	0.2
4B	Cecil sandy loam, 2 to 7 percent slopes	22,392	0	0	22,392	6.8
4C	Cecil sandy loam, 7 to 15 percent slopes	14,698	0	0	14,698	4.5
4D	Cecil sandy loam, 15 to 25 percent slopes	633	0	0	633	0.2
4B3	Cecil clay loam, 2 to 7 percent slopes, severely eroded	266	0	0	266	0.1
5A	Emporia sandy loam, 0 to 2 percent slopes	7,767	59	118	7,944	2.4
5B	Emporia sandy loam, 2 to 6 percent slopes	14,811	377	0	15,188	4.6
5C	Emporia sandy loam, 6 to 10 percent slopes	205	0	0	205	0.1
6D	Emporia-Slagle complex, 10 to 25 percent slopes	266	0	0	266	0.1
7B	Emporia-Urban land complex, 0 to 6 percent slopes	0	339	0	339	0.1
8B	Georgeville silt loam, 2 to 7 percent slopes	22,474	0	0	22,474	6.8
8C	Georgeville silt loam, 7 to 15 percent slopes	8,808	0	0	8,808	2.7
8D	Georgeville silt loam, 15 to 25 percent slopes	504	0	0	504	0.2
8B3	Georgeville clay loam, 2 to 7 percent slopes, severely eroded	205	0	0	205	0.1
8C3	Georgeville clay loam, 7 to 15 percent slopes, severely eroded	318	0	0	318	0.1
9B	Helena loam, 2 to 7 percent slopes	5,847	133	44	6,024	1.8
9C	Helena loam, 7 to 15 percent slopes	325	0	0	325	0.1
10B	Herndon loam, 2 to 7 percent slopes	19,609	0	0	19,609	6.0
10C	Herndon loam, 7 to 15 percent slopes	8,785	0	0	8,785	2.7
11B	Iredell loam, 2 to 7 percent slopes	7,773	0	0	7,773	2.4
11C	Iredell loam, 7 to 15 percent slopes	734	0	0	734	0.2
12A	Mattaponi sandy loam, 0 to 2 percent slopes	11,286	1,651	0	12,937	3.9
12B	Mattaponi sandy loam, 2 to 6 percent slopes	26,723	1,276	38	28,037	8.5
12C	Mattaponi sandy loam, 6 to 10 percent slopes	3,612	386	0	3,998	1.2
13B	Mattaponi-Urban land complex, 0 to 6 percent slopes	0	2,522	2,677	5,199	1.6
14A	Myatt silt loam, 0 to 2 percent slopes, occasionally flooded	2,809	258	0	3,067	0.9
15B	Nansemond sandy loam, 2 to 6 percent slopes	269	0	0	269	0.1
15C	Nansemond sandy loam, 6 to 10 percent slopes	222	0	0	222	0.1
16A	Roanoke loam, 0 to 2 percent slopes, occasionally flooded	24,128	1,082	535	25,745	7.8
17A	Slagle sandy loam, 0 to 2 percent slopes	9,582	431	0	10,013	3.0
17B	Slagle sandy loam, 2 to 6 percent slopes	6,277	68	0	6,345	1.9
17C	Slagle sandy loam, 6 to 10 percent slopes	268	0	0	268	0.1
18A	State fine sandy loam, 0 to 2 percent slopes, occasionally flooded	114	0	0	114	*
19B	Uchee loamy sand, 0 to 6 percent slopes	1,825	137	0	1,962	0.6
19C	Uchee loamy sand, 6 to 10 percent slopes	500	0	0	500	0.2
20	Udorthents, 0 to 25 percent slopes	750	749	419	1,918	0.6
	Water	179	2,007	150	2,336	0.7
	Total	309,300	14,700	5,000	329,000	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland)

Map symbol	Soil name
1A	Altavista fine sandy loam, 0 to 2 percent slopes, occasionally flooded
1B	Altavista fine sandy loam, 2 to 6 percent slopes, occasionally flooded
2B	Appling sandy loam, 2 to 7 percent slopes
4B	Cecil sandy loam, 2 to 7 percent slopes
5A	Emporia sandy loam, 0 to 2 percent slopes
5B	Emporia sandy loam, 2 to 6 percent slopes
8B	Georgeville silt loam, 2 to 7 percent slopes
9B	Helena loam, 2 to 7 percent slopes
10B	Herndon loam, 2 to 7 percent slopes
12A	Mattaponi sandy loam, 0 to 2 percent slopes
12B	Mattaponi sandy loam, 2 to 6 percent slopes
15B	Nansemond sandy loam, 2 to 6 percent slopes
17A	Slagle sandy loam, 0 to 2 percent slopes
17B	Slagle sandy loam, 2 to 6 percent slopes
18A	State fine sandy loam, 0 to 2 percent slopes, occasionally flooded
19B	Uchee loamy sand, 0 to 6 percent slopes

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Corn silage	Tobacco	Soybeans	Wheat	Peanuts	Pasture
		Bu	Tons	Lbs	Bu	Bu	Lbs	AUM*
1A--Altavista	IIw	125	25	3,000	42	55	3,500	11.5
1B--Altavista	IIe	115	23	2,900	38	55	3,400	11.5
2B--Appling	IIe	95	19	2,950	35	45	---	8.0
2C--Appling	IIIe	80	16	2,700	25	35	---	7.0
2D--Appling	IVe	70	14	2,000	20	25	---	6.5
3B. Appling-Urban land								
3C. Appling-Urban land								
4B--Cecil	IIe	95	19	2,700	35	45	---	8.0
4C--Cecil	IIIe	80	16	2,500	25	35	---	7.0
4D--Cecil	IVe	70	14	1,800	20	25	---	5.5
4B3--Cecil	IIIe	70	14	1,800	20	25	---	5.5
5A--Emporia	I	110	22	3,000	35	55	4,000	11.5
5B--Emporia	IIe	100	20	2,900	30	50	3,700	11.5
5C--Emporia	IIIe	90	18	2,700	25	45	3,400	11.0
6D--Emporia-Slagle	IVe	---	---	---	---	---	---	10.0
7B. Emporia-Urban land								
8B--Georgeville	IIe	95	19	2,400	35	45	---	8.0
8C--Georgeville	IIIe	80	14	2,200	25	35	---	7.0

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Corn silage	Tobacco	Soybeans	Wheat	Peanuts	Pasture
		Bu	Tons	Lbs	Bu	Bu	Lbs	AUM*
8D--Georgeville	IVe	70	14	1,700	20	25	---	6.5
8B3--Georgeville	IIIe	70	14	1,700	20	25	---	6.5
8C3--Georgeville	IVe	65	13	1,600	15	20	---	6.0
9B--Helena	IIe	80	16	2,100	25	35	---	7.0
9C--Helena	IIIe	60	12	1,700	15	20	---	6.0
10B--Herndon	IIe	95	19	2,200	35	45	---	8.0
10C--Herndon	IIIe	80	16	2,400	25	35	---	7.0
11B--Iredell	IIe	65	13	---	---	---	---	6.0
11C--Iredell	IIIe	60	12	---	---	---	---	5.5
12A--Mattaponi	IIw	110	22	3,100	35	50	---	6.5
12B--Mattaponi	IIe	95	19	2,900	30	45	---	6.0
12C--Mattaponi	IIIe	75	15	2,600	25	40	---	5.0
13B. Mattaponi-Urban land								
14A--Myatt	IVw	---	---	---	---	---	---	---
15B--Nansemond	IIe	115	23	2,600	35	40	3,800	11.0
15C--Nansemond	IIIe	90	18	2,300	30	35	3,600	10.5
16A--Roanoke	IVw	---	---	---	---	---	---	5.2
17A--Slagle	IIw	125	25	3,000	40	45	3,700	11.5
17B--Slagle	IIe	115	23	2,800	35	40	3,500	11.5
17C--Slagle	IIIe	100	20	2,500	30	35	3,300	10.5

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Corn silage	Tobacco	Soybeans	Wheat	Peanuts	Pasture
		Bu	Tons	Lbs	Bu	Bu	Lbs	AUM*
18A---------- State	IIw	110	22	2,700	35	50	3,300	10.0
19B---------- Uchee	IIIs	70	14	---	30	35	3,000	6.0
19C---------- Uchee	IVs	65	13	---	25	30	2,500	5.5
20. Udorthents								

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
1A, 1B---------- Altavista	9A	Slight	Slight	Slight	Slight	Loblolly pine-------	91	9	Loblolly pine.
						Longleaf pine-------	87	8	
						White oak-----------	77	4	
						Shortleaf pine------	---	---	
						Sweetgum------------	---	---	
						Red maple-----------	---	---	
						Yellow-poplar-------	---	---	
						Southern red oak----	---	---	
						Water oak-----------	---	---	
						American beech------	---	---	
						Hickory-------------	---	---	
2B, 2C, 2D------ Appling	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	84	8	Loblolly pine, shortleaf pine.
						Shortleaf pine------	65	7	
						Virginia pine-------	74	8	
						Scarlet oak---------	74	4	
						White oak-----------	64	3	
						Yellow-poplar-------	88	6	
						Sweetgum------------	---	---	
						Southern red oak----	---	---	
						Hickory-------------	---	---	
3B, 3C:									
Appling--------	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	84	8	Loblolly pine, shortleaf pine.
						Shortleaf pine------	65	7	
						Virginia pine-------	74	8	
						Scarlet oak---------	74	4	
						White oak-----------	64	3	
						Yellow-poplar-------	88	6	
						Sweetgum------------	---	---	
						Southern red oak----	---	---	
						Hickory-------------	---	---	
Urban land.									
4B, 4C---------- Cecil	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	83	8	Loblolly pine, shortleaf pine.
						Shortleaf pine------	69	8	
						Virginia pine-------	71	8	
						White oak-----------	79	4	
						Northern red oak----	81	4	
						Southern red oak----	79	4	
						Post oak------------	72	4	
						Scarlet oak---------	81	4	
						Sweetgum------------	76	5	
						Yellow-poplar-------	92	6	
4D---------- Cecil	8R	Moderate	Moderate	Slight	Slight	Loblolly pine-------	83	8	Loblolly pine, shortleaf pine.
						Shortleaf pine------	69	8	
						Virginia pine-------	71	8	
						White oak-----------	79	4	
						Northern red oak----	81	4	
						Southern red oak----	79	4	
						Post oak------------	72	4	
						Scarlet oak---------	81	4	
						Sweetgum------------	76	5	
						Yellow-poplar-------	92	6	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
4B3---------- Cecil	7C	Slight	Moderate	Moderate	Slight	Loblolly pine-------	72	7	Loblolly pine, shortleaf pine.
						Shortleaf pine------	63	7	
						Virginia pine-------	65	7	
						White oak-----------	64	3	
						Northern red oak----	---	---	
5A, 5B, 5C------ Emporia	7A	Slight	Slight	Slight	Slight	Loblolly pine-------	75	7	Loblolly pine, sweetgum.
						Southern red oak----	70	4	
6D:									
Emporia--------	7R	Moderate	Moderate	Slight	Slight	Loblolly pine-------	75	7	Loblolly pine, sweetgum.
						Southern red oak----	70	4	
Slagle---------	9W	Slight	Slight	Slight	Slight	Loblolly pine-------	86	9	Loblolly pine, sweetgum, yellow-poplar.
						Sweetgum------------	86	7	
						Southern red oak----	76	4	
						Water oak-----------	76	5	
						Yellow-poplar-------	90	6	
7B:									
Emporia--------	7A	Slight	Slight	Slight	Slight	Loblolly pine-------	75	7	Loblolly pine, sweetgum.
						Southern red oak----	70	4	
Urban land.									
8B, 8C---------- Georgeville	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	81	8	Loblolly pine, Virginia pine, eastern redcedar, black walnut, yellow-poplar.
						Longleaf pine-------	67	5	
						Shortleaf pine------	63	7	
						White oak-----------	69	4	
						Scarlet oak---------	70	4	
						Southern red oak----	67	3	
8D---------- Georgeville	8R	Moderate	Moderate	Slight	Slight	Loblolly pine-------	81	8	Loblolly pine, Virginia pine, eastern redcedar, black walnut, yellow-poplar.
						Longleaf pine-------	67	5	
						Shortleaf pine------	63	7	
						White oak-----------	69	4	
						Scarlet oak---------	70	4	
						Southern red oak----	67	3	
8B3---------- Georgeville	6C	Slight	Moderate	Moderate	Slight	Loblolly pine-------	70	6	Loblolly pine, Virginia pine.
						Longleaf pine-------	60	4	
8C3---------- Georgeville	6C	Moderate	Moderate	Moderate	Slight	Loblolly pine-------	70	6	Loblolly pine, Virginia pine.
						Longleaf pine-------	60	4	
9B, 9C---------- Helena	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	84	8	Loblolly pine, yellow-poplar.
						Shortleaf pine------	66	7	
						White oak-----------	---	---	
						Yellow-poplar-------	---	---	
						Sweetgum------------	---	---	
						Northern red oak----	---	---	
						Southern red oak----	---	---	
						Black oak-----------	---	---	
						Hickory-------------	---	---	
						Virginia pine-------	---	---	
						Willow oak----------	---	---	
						American elm--------	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
10B, 10C-------- Herndon	8A	Slight	Slight	Slight	Slight	Loblolly pine------- Shortleaf pine------ White oak----------- Southern red oak---- Yellow-poplar-------	80 61 65 72 91	8 6 3 4 6	Loblolly pine.
11B, 11C-------- Iredell	6C	Slight	Moderate	Moderate	Slight	Loblolly pine------- Shortleaf pine------ Post oak----------- White oak-----------	67 58 44 47	6 6 2 2	Loblolly pine, eastern redcedar.
12A, 12B, 12C--- Mattaponi	8A	Slight	Slight	Slight	Slight	Loblolly pine------- White oak----------- Virginia pine------- Sweetgum-----------	80 70 70 76	8 4 8 5	Loblolly pine, shortleaf pine.
13B: Mattaponi------	8A	Slight	Slight	Slight	Slight	Loblolly pine------- White oak----------- Virginia pine------- Sweetgum-----------	80 70 70 76	8 4 8 5	Loblolly pine, shortleaf pine.
Urban land.									
14A---------- Myatt	9W	Slight	Severe	Severe	Moderate	Loblolly pine------- Slash pine---------- Sweetgum---------- Water oak----------- Southern red oak---- White oak----------- American sycamore--- Blackgum---------- Shumard oak---------	88 92 92 86 --- --- --- --- ---	9 12 8 6 --- --- --- --- ---	Loblolly pine, slash pine, sweetgum.
15B, 15C-------- Nansemond	9W	Slight	Moderate	Slight	Slight	Loblolly pine------- Sweetgum---------- Shortleaf pine------ Yellow-poplar------- White oak-----------	88 90 77 90 ---	9 7 9 6 ---	Loblolly pine, yellow-poplar, black walnut, sweetgum.
16A---------- Roanoke	7W	Slight	Severe	Severe	Slight	Sweetgum---------- Willow oak---------- White oak-----------	90 76 75	7 4 4	Sweetgum.
17A, 17B, 17C--- Slagle	9W	Slight	Slight	Slight	Slight	Loblolly pine------- Sweetgum---------- Southern red oak---- Water oak----------- Yellow-poplar-------	86 86 76 76 90	9 7 4 5 6	Loblolly pine, sweetgum, yellow-poplar.
18A---------- State	9A	Slight	Slight	Slight	Slight	Loblolly pine------- Southern red oak---- Yellow-poplar------- Virginia pine------- Hickory---------- American beech------ White oak-----------	86 85 100 85 --- --- ---	9 5 8 9 --- --- ---	Loblolly pine, black walnut, yellow-poplar.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Productivity class*	
19B, 19C-------- Uchee	8S	Slight	Moderate	Moderate	Slight	Loblolly pine------- Longleaf pine------- Shortleaf pine------	82 67 ---	8 5 ---	Loblolly pine, longleaf pine, slash pine.

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 8.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1A Altavista	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
1B Altavista	Severe: flooding.	Moderate: wetness.	Moderate: slope, wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
2B Appling	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
2C Appling	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
2D Appling	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
3B: Appling	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
Urban land	Variable	Variable	Variable	Variable	Variable.
3C: Appling	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Urban land	Variable	Variable	Variable	Variable	Variable.
4B Cecil	Slight	Slight	Moderate: slope.	Slight	Slight.
4C Cecil	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
4D Cecil	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
4B3 Cecil	Slight	Slight	Moderate: slope.	Slight	Slight.
5A Emporia	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: small stones, percs slowly.	Slight	Slight.
5B Emporia	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight	Slight.
5C Emporia	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
6D:					
Emporia	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Slagle	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness.
7B:					
Emporia	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight	Slight.
Urban land	Variable	Variable	Variable	Variable	Variable.
8B Georgeville	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
8C Georgeville	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
8D Georgeville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
8B3 Georgeville	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
8C3 Georgeville	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
9B Helena	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
9C Helena	Moderate: slope, wetness, percs slowly.	Moderate: slope, percs slowly, wetness.	Severe: slope.	Moderate: wetness.	Moderate: slope, wetness.
10B Herndon	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
10C Herndon	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
11B Iredell	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
11C Iredell	Severe: wetness.	Moderate: slope, wetness.	Severe: slope, wetness.	Moderate: wetness.	Moderate: wetness, slope.
12A Mattaponi	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: percs slowly.	Slight	Slight.
12B Mattaponi	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
12C Mattaponi	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
13B: Mattaponi	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
Urban land	Variable	Variable	Variable	Variable	Variable.
14A Myatt	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
15B Nansemond	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: wetness, droughty.
15C Nansemond	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: wetness.	Moderate: wetness, droughty, slope.
16A Roanoke	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
17A Slagle	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
17B Slagle	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
17C Slagle	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness.
18A State	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
19B Uchee	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, small stones, too sandy.	Moderate: too sandy.	Moderate: droughty.
19C Uchee	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.
20 Udorthents	Variable	Variable	Variable	Variable	Variable.

TABLE 9.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1A---------- Altavista	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
1B---------- Altavista	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
2B---------- Appling	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
2C---------- Appling	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
2D---------- Appling	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
3B:										
Appling----------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Urban land.										
3C:										
Appling----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Urban land.										
4B---------- Cecil	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
4C---------- Cecil	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
4D---------- Cecil	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
4B3---------- Cecil	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
5A, 5B---------- Emporia	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
5C---------- Emporia	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
6D:										
Emporia----------	Poor	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
Slagle----------	Poor	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
7B:										
Emporia----------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Urban land.										

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
8B---- Georgeville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
8C---- Georgeville	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
8D---- Georgeville	Very poor.	Very poor.	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
8B3---- Georgeville	Fair	Fair	Fair	Good	Fair	Very poor.	Very poor.	Fair	Good	Very poor.
8C3---- Georgeville	Poor	Poor	Poor	Fair	Poor	Very poor.	Very poor.	Poor	Fair	Very poor.
9B---- Helena	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
9C---- Helena	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
10B---- Herndon	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
10C---- Herndon	Fair	Good	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
11B, 11C---- Iredell	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
12A, 12B---- Mattaponi	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
12C---- Mattaponi	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
13B:										
Mattaponi----	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Urban land.										
14A---- Myatt	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
15B---- Nansemond	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
15C---- Nansemond	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
16A---- Roanoke	Poor	Poor	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
17A---- Slagle	Good	Good	Good	Good	Good	Good	Poor	Good	Good	Fair.
17B---- Slagle	Poor	Fair	Good	Good	Good	Fair	Very poor.	Fair	Good	Poor.
17C---- Slagle	Fair	Good	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
18A---------- State	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
19B---------- Uchee	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
19C---------- Uchee	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
20. Udorthents										

TABLE 10.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1A, 1B Altavista	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: wetness, flooding.
2B Appling	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
2C Appling	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
2D Appling	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
3B: Appling	Moderate: too clayey.	Slight	Slight	Slight	Moderate: low strength.	Slight.
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
3C: Appling	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
4B Cecil	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
4C Cecil	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
4D Cecil	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
4B3 Cecil	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
5A Emporia	Moderate: too clayey, wetness.	Slight	Moderate: wetness, shrink-swell.	Slight	Moderate: low strength.	Slight.
5B Emporia	Moderate: too clayey, wetness.	Slight	Moderate: wetness, shrink-swell.	Moderate: slope.	Moderate: low strength.	Slight.
5C Emporia	Moderate: too clayey, wetness, slope.	Moderate: slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
6D:						
Emporia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Slagle	Severe: cutbanks cave, wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe slope.
7B:						
Emporia	Moderate: too clayey, wetness.	Slight	Moderate: wetness, shrink-swell.	Slight	Moderate: low strength.	Slight.
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
8B Georgeville	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
8C Georgeville	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
8D Georgeville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
8B3 Georgeville	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
8C3 Georgeville	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
9B Helena	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
9C Helena	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope, wetness.
10B Herndon	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
10C Herndon	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
11B Iredell	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness.
11C Iredell	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: wetness, slope.
12A Mattaponi	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
12B Mattaponi	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
12C Mattaponi	Moderate: too clayey, wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
13B: Mattaponi	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
14A Myatt	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness.
15B Nansemond	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness.	Moderate: wetness, droughty.
15C Nansemond	Severe: wetness, cutbanks cave.	Moderate: slope, wetness.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, droughty, slope.
16A Roanoke	Severe: wetness, cutbanks cave.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
17A Slagle	Severe: cutbanks cave, wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, low strength, wetness.	Moderate: wetness.
17B Slagle	Severe: cutbanks cave, wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Moderate: shrink-swell, low strength, wetness.	Moderate: wetness.
17C Slagle	Severe: cutbanks cave, wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Moderate: shrink-swell, low strength, wetness.	Moderate: wetness, slope.
18A State	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
19B Uchee	Severe: cutbanks cave.	Slight	Moderate: wetness, shrink-swell.	Slight	Slight	Moderate: droughty.
19C Uchee	Severe: cutbanks cave.	Moderate: slope.	Moderate: wetness, shrink-swell, slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
20---------- Udorthents	Variable-------	Variable-------	Variable-------	Variable-------	Variable-------	Variable.

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1A, 1B Altavista	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness, too clayey.
2B Appling	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
2C Appling	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
2D Appling	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
3B: Appling	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
Urban land	Variable	Variable	Variable	Variable	Variable.
3C: Appling	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
Urban land	Variable	Variable	Variable	Variable	Variable.
4B Cecil	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
4C Cecil	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
4D Cecil	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
4B3 Cecil	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
5A, 5B Emporia	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Moderate: wetness, too clayey.	Slight	Fair: too clayey, wetness.
5C Emporia	Severe: wetness, percs slowly.	Severe: seepage, slope, wetness.	Moderate: wetness, slope, too clayey.	Moderate: slope.	Fair: slope, too clayey, wetness.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
6D:					
Emporia	Severe: wetness, percs slowly, slope.	Severe: seepage, slope, wetness.	Severe: slope.	Severe: slope.	Poor: slope.
Slagle	Severe: wetness, percs slowly, slope.	Severe: seepage, wetness, slope.	Severe: seepage, wetness, slope.	Severe: wetness, slope.	Poor: slope.
7B:					
Emporia	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Moderate: wetness, too clayey.	Slight	Fair: too clayey, wetness.
Urban land	Variable	Variable	Variable	Variable	Variable.
8B Georgeville	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
8C Georgeville	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
8D Georgeville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
8B3 Georgeville	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
8C3 Georgeville	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
9B Helena	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
9C Helena	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness, too clayey.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
10B Herndon	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
10C Herndon	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
11B Iredell	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
11C Iredell	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
12A, 12B Mattaponi	Severe: wetness, percs slowly.	Severe: wetness.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
12C Mattaponi	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
13B: Mattaponi	Severe: wetness, percs slowly.	Severe: wetness.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
Urban land	Variable	Variable	Variable	Variable	Variable.
14A Myatt	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
15B Nansemond	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Fair: too sandy, wetness.
15C Nansemond	Severe: wetness.	Severe: seepage, wetness, slope.	Severe: seepage, wetness.	Severe: seepage, wetness.	Fair: too sandy, slope, wetness.
16A Roanoke	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
17A, 17B, 17C Slagle	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: too clayey, wetness.
18A State	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding.	Fair: too clayey, thin layer.
19B Uchee	Severe: wetness, percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
19C Uchee	Severe: wetness, percs slowly.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too sandy, slope.
20 Udorthents	Variable	Variable	Variable	Variable	Variable.

TABLE 12.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1A, 1B Altavista	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
2B, 2C Appling	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
2D Appling	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
3B, 3C: Appling	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Urban land	Variable	Variable	Variable	Variable.
4B, 4C Cecil	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
4D Cecil	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
4B3 Cecil	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
5A, 5B Emporia	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
5C Emporia	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
6D: Emporia	Fair: shrink-swell, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Slagle	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
7B: Emporia	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Urban land	Variable	Variable	Variable	Variable.
8B, 8C Georgeville	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
8D Georgeville	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
8B3, 8C3---------- Georgeville	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
9B, 9C---------- Helena	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
10B, 10C---------- Herndon	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
11B, 11C---------- Iredell	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
12A, 12B, 12C--------- Mattaponi	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
13B:				
Mattaponi----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Urban land----------	Variable----------	Variable----------	Variable----------	Variable.
14A---------- Myatt	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
15B---------- Nansemond	Fair: wetness.	Probable----------	Improbable: too sandy.	Good.
15C---------- Nansemond	Fair: wetness.	Probable----------	Improbable: too sandy.	Fair: slope.
16A---------- Roanoke	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
17A, 17B, 17C--------- Slagle	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
18A---------- State	Good----------	Probable----------	Improbable: too sandy.	Fair: too clayey.
19B---------- Uchee	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, small stones.
19C---------- Uchee	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, small stones, slope.
20---------- Udorthents	Variable----------	Variable----------	Variable----------	Variable.

TABLE 13.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1A Altavista	Moderate: seepage.	Severe: piping, wetness.	Flooding	Wetness	Wetness, soil blowing.	Favorable.
1B Altavista	Moderate: seepage, slope.	Severe: piping, wetness.	Flooding, slope.	Wetness, slope.	Wetness, soil blowing.	Favorable.
2B Appling	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope	Soil blowing	Favorable.
2C, 2D Appling	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Soil blowing, slope.	Slope.
3B: Appling	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope	Soil blowing	Favorable.
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
3C: Appling	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Soil blowing, slope.	Slope.
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
4B Cecil	Moderate: seepage, slope.	Severe: piping, hard to pack.	Deep to water	Slope	Favorable	Soil blowing.
4C, 4D Cecil	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope	Slope	Slope, soil blowing.
4B3 Cecil	Moderate: seepage, slope.	Severe: piping, hard to pack.	Deep to water	Slope	Favorable	Favorable.
5A Emporia	Moderate: seepage.	Moderate: thin layer, piping.	Deep to water	Soil blowing	Soil blowing, percs slowly.	Percs slowly.
5B Emporia	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Soil blowing, slope.	Soil blowing, percs slowly.	Percs slowly.
5C Emporia	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Soil blowing, slope.	Slope, soil blowing, percs slowly.	Slope, percs slowly.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
6D:						
Emporia	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Soil blowing, slope.	Slope, soil blowing, percs slowly.	Slope, percs slowly.
Slagle	Severe: seepage, slope.	Severe: wetness.	Percs slowly, slope.	Slope, wetness.	Wetness, percs slowly, slope.	Slope, percs slowly.
7B:						
Emporia	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Soil blowing, slope.	Soil blowing, percs slowly.	Percs slowly.
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
8B Georgeville	Moderate: slope, seepage.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
8C, 8D Georgeville	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
8B3 Georgeville	Moderate: slope, seepage.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
8C3 Georgeville	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
9B Helena	Moderate: slope.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness, percs slowly.	Wetness, percs slowly.	Percs slowly.
9C Helena	Severe: slope.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness, percs slowly.	Slope, wetness, percs slowly.	Slope, percs slowly.
10B Herndon	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
10C Herndon	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
11B Iredell	Moderate: slope.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness.	Wetness	Wetness, percs slowly.
11C Iredell	Severe: slope.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness.	Slope, wetness.	Wetness, slope, percs slowly.
12A Mattaponi	Slight	Moderate: thin layer, hard to pack.	Deep to water	Favorable	Favorable	Favorable.
12B Mattaponi	Moderate: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope	Favorable	Favorable.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
12C---------- Mattaponi	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
13B:						
Mattaponi--------	Moderate: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope----------	Favorable------	Favorable.
Urban land-------	Variable-------	Variable-------	Variable-------	Variable-------	Variable-------	Variable.
14A---------- Myatt	Moderate: seepage.	Severe: piping, wetness.	Flooding-------	Wetness, flooding.	Wetness--------	Wetness.
15B---------- Nansemond	Severe: seepage.	Severe: seepage, piping, wetness.	Slope, cutbanks cave.	Slope, wetness, droughty.	Wetness, too sandy.	Droughty.
15C---------- Nansemond	Severe: seepage, slope.	Severe: seepage, piping, wetness.	Slope, cutbanks cave.	Slope, wetness, droughty.	Slope, wetness, too sandy.	Slope, droughty.
16A---------- Roanoke	Severe: seepage.	Severe: wetness.	Percs slowly, flooding.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
17A---------- Slagle	Severe: seepage.	Severe: wetness.	Percs slowly---	Wetness--------	Wetness, percs slowly.	Percs slowly.
17B, 17C---------- Slagle	Severe: seepage.	Severe: wetness.	Percs slowly, slope.	Slope, wetness.	Wetness, percs slowly.	Percs slowly.
18A---------- State	Severe: seepage.	Moderate: thin layer, piping.	Deep to water	Soil blowing---	Soil blowing---	Favorable.
19B---------- Uchee	Moderate: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, slope.	Too sandy------	Droughty.
19C---------- Uchee	Severe: slope.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, slope.	Slope, too sandy.	Slope, droughty.
20---------- Udorthents	Variable-------	Variable-------	Variable-------	Variable-------	Variable-------	Variable.

TABLE 14.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>3 inches	4	10	40	200		
	In				Pct					Pct	
1A, 1B----------	0-10	Fine sandy loam	ML, CL-ML, SM, SC-SM	A-4	0	95-100	90-100	65-85	35-60	<23	NP-7
Altavista	10-49	Clay loam, sandy clay loam, sandy loam, loam.	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7	0	95-100	90-100	55-99	30-75	20-45	5-28
	49-72	Variable---------	---	---	---	---	---	---	---	---	---
2B, 2C, 2D-------	0-11	Sandy loam-------	SM, SC-SM	A-2	0-5	86-100	80-100	55-70	25-40	<35	NP-7
Appling	11-33	Sandy clay, sandy clay loam, clay.	MH, ML, CL, SM, SC	A-7, A-2, A-6	0-5	95-100	90-100	70-95	30-80	30-60	10-45
	33-43	Sandy clay, clay loam, sandy clay loam.	SC, CL	A-4, A-6, A-7	0-5	90-100	90-100	70-90	40-75	25-45	8-22
	43-72	Variable---------	---	---	---	---	---	---	---	---	---
3B, 3C:											
Appling---------	0-11	Sandy loam-------	SM, SC-SM	A-2	0-5	86-100	80-100	55-70	25-40	<35	NP-7
	11-33	Sandy clay, sandy clay loam, clay.	MH, ML, CL, SM, SC	A-7, A-2, A-6	0-5	95-100	90-100	70-95	30-80	30-60	10-45
	33-43	Clay loam, sandy clay loam.	SC, CL	A-4, A-6, A-7	0-5	95-100	90-100	70-90	40-75	25-45	8-22
	43-72	Variable---------	---	---	---	---	---	---	---	---	---
Urban land.											
4B, 4C, 4D-------	0-9	Sandy loam-------	SM, SC-SM	A-2, A-4	0-5	84-100	80-100	55-70	26-42	<30	NP-7
Cecil	9-12	Sandy clay loam, clay loam.	SM, SC, ML, CL	A-4, A-6	0-5	75-100	80-100	68-95	38-81	21-35	3-15
	12-55	Clay, clay loam, sandy clay loam.	MH, ML, SM, SC	A-2, A-7, A-6	0-5	97-100	85-100	72-99	30-80	30-70	10-50
	55-72	Variable---------	---	---	---	---	---	---	---	---	---
4B3---------------	0-9	Clay loam--------	SM, SC, CL, ML	A-4, A-6	0-5	75-100	80-100	68-95	38-81	21-35	3-15
Cecil	9-12	Sandy clay loam, clay loam.	SM, SC, ML, CL	A-4, A-6	0-5	75-100	80-100	68-95	38-81	21-35	3-15
	12-55	Clay, clay loam, sandy clay loam.	MH, ML, SM, SC	A-2, A-7, A-6	0-5	97-100	85-100	72-99	30-80	30-70	10-50
	55-72	Variable---------	---	---	---	---	---	---	---	---	---
5A, 5B, 5C-------	0-7	Sandy loam-------	CL, SC, SM, ML	A-2, A-4, A-6	0-3	90-100	80-100	50-70	25-40	<25	NP-15
Emporia	7-30	Loam, sandy loam, clay loam.	SC, CL	A-2, A-4, A-6, A-7	0-2	90-100	80-100	45-95	25-70	20-50	8-30
	30-53	Sandy clay loam, clay loam, sandy clay.	SC, CL, CH	A-2, A-4, A-6, A-7	0-2	90-100	80-100	45-95	30-80	25-55	8-30
	53-72	Sandy loam to clay.	SM, SC, ML, CL	A-1, A-2, A-4, A-6	0-5	70-100	55-100	30-90	20-60	<40	NP-25

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>3 inches	4	10	40	200		
	In				Pct					Pct	
6D:											
Emporia	0-7	Sandy loam	CL, SC, SM, ML	A-2, A-4, A-6	0-3	90-100	80-100	50-70	25-40	<25	NP-15
	7-30	Loam, sandy loam, clay loam.	SC, CL	A-2, A-4, A-6, A-7	0-2	90-100	80-100	45-95	25-70	20-50	8-30
	30-53	Sandy clay loam, clay loam, sandy clay.	SC, CL, CH	A-2, A-4, A-6, A-7	0-2	90-100	80-100	45-95	30-80	25-55	8-30
	53-72	Sandy loam to clay.	SM, SC, ML, CL	A-1, A-2, A-4, A-6	0-5	70-100	55-100	30-90	20-60	<40	NP-25
Slagle	0-9	Sandy loam	SM, SC, SC-SM	A-2, A-4	0-2	95-100	95-100	55-95	20-50	<25	NP-10
	9-14	Sandy loam, loam	SC, SC-SM, CL, CL-ML	A-4, A-6	0-2	95-100	95-100	60-95	30-75	20-35	5-12
	14-44	Sandy clay loam, clay loam.	SC, CL	A-4, A-6, A-7	0-2	95-100	95-100	75-95	40-75	25-50	8-30
	44-72	Sandy loam to clay loam.	SM, SC, ML, CL	A-1, A-2, A-4, A-6	0-5	90-100	80-100	50-90	25-80	<40	NP-25
7B:											
Emporia	0-7	Sandy loam	CL, SC, SM, ML	A-2, A-4, A-6	0-3	90-100	80-100	50-70	25-40	<25	NP-15
	7-30	Loam, sandy loam, clay loam.	SC, CL	A-2, A-4, A-6, A-7	0-2	90-100	80-100	45-95	25-70	20-50	8-30
	30-53	Sandy clay loam, clay loam, sandy clay.	SC, CL, CH	A-2, A-4, A-6, A-7	0-2	90-100	80-100	45-95	30-80	25-55	8-30
	53-72	Sandy loam to clay.	SM, SC, ML, CL	A-1, A-2, A-4, A-6	0-5	70-100	55-100	30-90	20-60	<40	NP-25
Urban land.											
8B, 8C, 8D-- Georgeville	0-4	Silt loam	CL, ML	A-6, A-7, A-4	0-2	90-100	80-100	75-100	55-98	24-35	NP-12
	4-8	Silty clay loam, clay loam.	CL, ML, CL-ML	A-6, A-7, A-4	0-1	90-100	80-100	75-100	60-98	30-49	8-20
	8-51	Clay, silty clay, silty clay loam.	MH, ML	A-7	0-1	95-100	95-100	90-100	75-98	41-85	15-45
	51-75	Silty clay loam, loam, silt loam.	ML, CL, CL-ML	A-4, A-6	0-5	90-100	85-100	75-100	60-95	<30	NP-12
8B3, 8C3-- Georgeville	0-6	Clay loam	CL, ML	A-6, A-7, A-4	0-2	90-100	80-100	75-100	55-98	24-49	3-20
	6-51	Clay, silty clay, silty clay loam.	MH, ML	A-7	0-1	95-100	95-100	90-100	75-98	41-85	15-45
	51-75	Silty clay loam, loam, silt loam.	ML, CL, CL-ML	A-4, A-6	0-5	90-100	85-100	75-100	55-95	<30	NP-12
9B, 9C-- Helena	0-7	Loam	SM, SC-SM, SC, ML	A-2, A-4	0-5	90-100	80-100	70-95	50-75	<35	NP-10
	7-16	Sandy clay loam, clay loam.	CL, SC	A-6, A-7	0-5	95-100	80-100	70-95	30-80	30-49	15-26
	16-55	Clay loam, sandy clay loam, clay.	CH, SM, SC, CL	A-7, A-2, A-6	0-5	95-100	80-100	73-97	30-86	30-60	15-45
	55-72	Variable	---	---	---	---	---	---	---	---	---

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>3 inches	4	10	40	200		
	In				Pct					Pct	
10B, 10C--------- Herndon	0-12	Loam----------	ML, CL, CL-ML	A-4, A-6	0-2	90-100	80-100	70-98	50-75	<36	NP-12
	12-47	Silty clay loam	ML, CL	A-7, A-6	0-1	98-100	95-100	90-100	80-95	30-45	10-25
	47-72	Silt loam, loam	ML, CL	A-7, A-5	0-2	90-100	85-100	75-95	55-75	20-35	5-15
11B, 11C--------- Iredell	0-10	Loam----------	ML, CL-ML, CL	A-4, A-6	0-1	99-100	95-100	80-95	51-70	25-38	5-12
	10-26	Clay----------	CH	A-7	0	99-100	80-100	75-100	55-95	54-115	29-85
	26-72	Loam, sandy loam, sandy clay loam.	CL, CH, SC	A-7	0-1	98-100	80-100	50-95	25-75	41-60	20-39
12A, 12B, 12C---- Mattaponi	0-13	Sandy loam-------	SM, SC, SC-SM	A-2, A-4	0	90-100	80-100	50-70	25-40	<25	NP-10
	13-72	Clay loam, sandy clay, clay.	CL, CH, SC	A-6, A-7	0	80-100	50-100	50-100	25-95	35-70	15-40
13B:											
Mattaponi------- Urban land.	0-13	Sandy loam-------	SM, SC, SC-SM	A-2, A-4	0	90-100	80-100	50-100	20-50	<25	NP-10
	13-72	Clay loam, sandy clay, clay.	CL, CH, SC	A-6, A-7	0	80-100	50-100	50-100	25-95	35-70	15-40
14A-------------- Myatt	0-4	Silt loam--------	ML, CL-ML	A-4	0	95-100	95-100	85-100	65-90	<25	NP-5
	4-42	Loam, sandy clay loam, clay loam.	SM, SC, ML, CL	A-4	0	95-100	95-100	80-100	40-80	<30	NP-10
	42-72	Gravelly sandy clay loam, sandy clay loam, clay loam.	SC-SM, SC, CL-ML, CL	A-6, A-4, A-2	0	75-100	60-90	50-90	30-70	15-40	NP-15
15B, 15C--------- Nansemond	0-8	Sandy loam-------	SM, SC, SC-SM	A-2, A-4	0	100	95-100	55-70	30-40	<25	NP-10
	8-35	Fine sandy loam, sandy loam.	SM, SC-SM, SC	A-2, A-4, A-6	0	100	95-100	55-85	30-50	<25	NP-15
	35-49	Loamy fine sand, loamy sand.	SM, SC, SC-SM	A-1, A-2, A-4	0	100	95-100	40-75	15-30	<25	NP-10
	49-72	Loamy sand, sandy clay loam.	SM, SC-SM, SP-SM	A-1, A-2, A-3, A-4	0	95-100	80-100	35-95	12-50	20-55	NP-12
16A-------------- Roanoke	0-8	Loam----------	CL-ML, CL	A-4, A-6	0	95-100	85-100	75-100	60-75	20-35	5-16
	8-15	Clay loam, silty clay loam.	CL	A-6, A-7	0	95-100	85-100	80-100	80-95	35-45	14-20
	15-72	Clay, silty clay, clay loam.	CH, CL	A-7	0	90-100	85-100	85-100	65-95	45-70	22-40
17A, 17B, 17C---- Slagle	0-9	Sandy loam-------	SM, SC, SC-SM	A-2, A-4	0-2	95-100	95-100	55-95	20-50	<25	NP-10
	9-14	Sandy loam, loam	SC, SC-SM, CL, CL-ML	A-4, A-6	0-2	95-100	95-100	60-85	30-75	20-35	5-12
	14-44	Sandy clay loam, clay loam.	SC, CL	A-4, A-6, A-7	0-2	95-100	95-100	75-95	40-75	25-50	8-30
	44-72	Sandy loam to clay loam.	SM, SC, ML, CL	A-1, A-2, A-4, A-6	0-5	90-100	80-100	50-90	25-80	<40	NP-25

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>3 inches	4	10	40	200		
	In				Pct					Pct	
18A---------- State	0-8	Fine sandy loam	SM, ML, CL-ML, SC-SM	A-2, A-4	0	95-100	95-100	65-85	40-55	<28	NP-7
	8-42	Sandy clay loam, clay loam, sandy loam.	CL, SC	A-4, A-6	0	95-100	95-100	60-100	35-80	24-40	8-22
	42-72	Loamy sand, sandy loam.	SM, SC-SM, SP-SM	A-1, A-2, A-3, A-4	0	85-100	80-100	40-70	12-40	<25	NP-7
19B, 19C---------- Uchee	0-32	Loamy sand-------	SM	A-2, A-1-b	0	90-100	80-100	40-70	15-30	---	NP
	32-46	Sandy loam, sandy clay loam.	SC, SC-SM	A-2, A-4, A-6	0	90-100	80-100	50-80	25-50	20-40	6-20
	46-72	Sandy loam, sandy clay loam.	MH, CH, CL, SC	A-6, A-7, A-2-6, A-2-7	0	85-100	85-100	50-90	30-55	25-40	5-15
20. Udorthents											

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
1A, 1B	0-10	10-20	1.30-1.50	2.0-6.0	0.12-0.20	3.6-6.0	Low	0.24	5	3	.5-3
Altavista	10-49	18-35	1.30-1.50	0.6-2.0	0.12-0.20	3.6-6.0	Low	0.24			
	49-72	---	---	---	---	---					
2B, 2C, 2D	0-11	5-20	1.40-1.65	2.0-6.0	0.10-0.15	4.5-5.5	Low	0.24	4	3	.5-2
Appling	11-33	35-60	1.25-1.45	0.6-2.0	0.15-0.17	4.5-5.5	Low	0.28			
	33-43	20-50	1.25-1.45	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.28			
	43-72	---	---	---	---	---					
3B, 3C:											
Appling	0-11	5-20	1.40-1.65	2.0-6.0	0.10-0.15	4.5-5.5	Low	0.24	4	3	.5-2
	11-33	35-60	1.25-1.45	0.6-2.0	0.15-0.17	4.5-5.5	Low	0.28			
	33-43	20-50	1.25-1.45	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.28			
	43-72	---	---	---	---	---					
Urban land.											
4B, 4C, 4D	0-9	5-20	1.30-1.50	2.0-6.0	0.12-0.14	4.5-6.5	Low	0.28	4	3	.5-2
Cecil	9-12	20-35	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low	0.28			
	12-55	35-70	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low	0.28			
	55-72	---	---	---	---	---					
4B3	0-9	27-35	1.30-1.50	0.6-2.0	0.13-0.15	4.5-6.5	Low	0.28	3	3	.5-1
Cecil	9-12	27-35	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low	0.28			
	12-55	35-70	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low	0.28			
	55-72	---	---	---	---	---					
5A, 5B, 5C	0-7	7-18	1.30-1.40	2.0-6.0	0.10-0.17	4.5-6.0	Low	0.28	4	3	.5-2
Emporia	7-30	18-35	1.35-1.45	0.2-2.0	0.10-0.18	4.5-6.0	Low	0.28			
	30-53	21-40	1.45-1.60	0.06-0.6	0.10-0.16	4.5-6.0	Moderate	0.20			
	53-72	5-40	1.45-1.60	0.06-2.0	0.08-0.18	4.5-6.0	Moderate	0.20			
6D:											
Emporia	0-7	7-18	1.30-1.40	2.0-6.0	0.10-0.17	4.5-6.0	Low	0.28	4	3	.5-2
	7-30	18-35	1.35-1.45	0.2-2.0	0.10-0.18	4.5-6.0	Low	0.28			
	30-53	21-40	1.45-1.60	0.06-0.6	0.10-0.16	4.5-6.0	Moderate	0.20			
	53-72	5-40	1.45-1.60	0.06-2.0	0.08-0.18	4.5-6.0	Moderate	0.20			
Slagle	0-9	8-18	1.30-1.45	2.0-6.0	0.10-0.14	3.6-5.5	Low	0.28	5	3	.5-2
	9-14	12-27	1.30-1.45	0.6-2.0	0.10-0.18	3.6-5.5	Low	0.24			
	14-44	20-40	1.35-1.60	0.06-0.6	0.12-0.18	3.6-5.5	Moderate	0.24			
	44-72	5-32	1.35-1.50	0.2-6.0	0.08-0.15	3.6-5.5	Low	0.24			
7B:											
Emporia	0-7	7-18	1.30-1.40	2.0-6.0	0.10-0.17	4.5-6.0	Low	0.28	4	3	.5-2
	7-30	18-35	1.35-1.45	0.2-2.0	0.10-0.18	4.5-6.0	Low	0.28			
	30-53	21-40	1.45-1.60	0.06-0.6	0.10-0.16	4.5-6.0	Moderate	0.20			
	53-72	5-40	1.45-1.60	0.06-2.0	0.08-0.18	4.5-6.0	Moderate	0.20			
Urban land.											
8B, 8C, 8D	0-4	10-27	1.20-1.40	0.6-2.0	0.13-0.18	4.5-6.0	Low	0.49	4	6	<.5
Georgeville	4-8	27-35	1.20-1.40	0.6-2.0	0.13-0.18	4.5-5.5	Low	0.32			
	8-51	35-65	1.20-1.40	0.6-2.0	0.13-0.18	4.5-5.5	Low	0.28			
	51-75	15-40	1.20-1.40	0.6-2.0	0.05-0.10	4.5-5.5	Low	0.32			

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
8B3, 8C3--------- Georgeville	0-6 6-51 51-75	27-35 35-65 15-40	1.20-1.40 1.20-1.40 1.20-1.40	0.6-2.0 0.6-2.0 0.6-2.0	0.13-0.18 0.13-0.18 0.05-0.10	4.5-6.0 4.5-5.5 4.5-5.5	Low---------- Low---------- Low----------	0.49 0.28 0.32	4	6	<.5
9B, 9C----------- Helena	0-7 7-16 16-55 55-72	5-20 20-35 35-60 ---	1.58-1.62 1.46-1.56 1.44-1.55 ---	2.0-6.0 0.2-0.6 0.06-0.2 ---	0.10-0.12 0.13-0.15 0.13-0.15 ---	4.5-6.0 4.5-5.5 4.5-5.5 ---	Low---------- Moderate----- High--------- ----------	0.24 0.28 0.28 ----	4	3	.5-2
10B, 10C--------- Herndon	0-12 12-47 47-72	5-27 35-40 10-27	1.20-1.40 1.30-1.60 1.20-1.40	0.6-2.0 0.6-2.0 0.6-2.0	0.14-0.20 0.13-0.18 0.05-0.08	4.5-6.5 3.6-5.5 3.6-5.5	Low---------- Low---------- Low----------	0.43 0.28 0.32	5	5	.5-1
11B, 11C--------- Iredell	0-10 10-26 26-72	15-27 40-60 15-35	1.20-1.40 1.20-1.45 1.30-1.60	0.6-2.0 0.06-0.2 0.06-0.2	0.14-0.17 0.16-0.22 0.14-0.18	5.1-7.3 5.6-7.3 6.1-7.8	Low---------- Very high---- High---------	0.32 0.20 0.28	3	6	.5-2
12A, 12B, 12C---- Mattaponi	0-13 13-72	5-18 35-65	1.30-1.55 1.40-1.65	0.6-6.0 0.2-0.6	0.08-0.15 0.12-0.18	4.5-5.5 4.5-5.5	Low---------- Moderate-----	0.28 0.28	5	3	.5-2
13B: Mattaponi------- Urban land.	0-13 13-72	5-18 35-65	1.30-1.55 1.40-1.65	0.6-6.0 0.2-0.6	0.08-0.15 0.12-0.18	4.5-5.5 4.5-5.5	Low---------- Moderate-----	0.28 0.28	5	3	.5-2
14A-------------- Myatt	0-4 4-42 42-72	10-25 18-35 7-35	1.30-1.60 1.30-1.50 1.30-1.50	0.6-2.0 0.2-2.0 0.2-2.0	0.16-0.24 0.12-0.20 0.10-0.20	4.5-6.0 3.6-5.5 3.6-5.5	Low---------- Low---------- Low----------	0.32 0.28 0.24	5	5	.5-4
15B, 15C--------- Nansemond	0-8 8-35 35-49 49-72	6-15 10-18 4-12 2-27	1.20-1.50 1.25-1.45 1.30-1.55 1.35-1.55	2.0-6.0 2.0-6.0 2.0-6.0 6.0-20	0.08-0.14 0.10-0.16 0.06-0.11 0.02-0.10	3.6-5.5 3.6-5.5 3.6-5.5 3.6-5.5	Low---------- Low---------- Low---------- Low----------	0.20 0.17 0.15 0.15	3	3	1-2
16A-------------- Roanoke	0-8 8-15 15-72	10-27 20-35 35-60	1.20-1.50 1.20-1.50 1.35-1.65	0.6-2.0 <20 <0.2	0.14-0.20 0.16-0.19 0.10-0.19	3.6-5.5 3.6-5.5 3.6-5.5	Low---------- Moderate----- Moderate-----	0.37 0.24 0.24	4	5	.5-2
17A, 17B, 17C---- Slagle	0-9 9-14 14-44 44-72	8-18 12-27 20-40 5-32	1.30-1.45 1.30-1.45 1.35-1.60 1.35-1.50	2.0-6.0 0.6-2.0 0.06-0.6 0.2-6.0	0.10-0.14 0.10-0.18 0.12-0.18 0.08-0.15	3.6-5.5 3.6-5.5 3.6-5.5 3.6-5.5	Low---------- Low---------- Moderate----- Low----------	0.28 0.24 0.24 0.24	5	3	.5-2
18A-------------- State	0-8 8-42 42-72	5-15 18-34 2-15	1.25-1.40 1.35-1.50 1.35-1.50	0.6-6.0 0.6-2.0 >2.0	0.08-0.15 0.14-0.19 0.02-0.10	3.6-5.5 3.6-5.5 3.6-6.5	Low---------- Low---------- Low----------	0.28 0.28 0.17	5	3	<2
19B, 19C--------- Uchee	0-32 32-46 46-72	3-10 8-30 15-35	1.30-1.70 1.40-1.60 1.40-1.60	6.0-20 0.6-2.0 0.2-2.0	0.05-0.10 0.10-0.15 0.10-0.16	4.5-5.5 4.5-5.5 4.5-5.5	Low---------- Low---------- Moderate-----	0.10 0.24 0.28	5	2	<1
20. Udorthents											

TABLE 16.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "occasional," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
1A, 1B---------- Altavista	C	Occasional	Very brief	Mar-Jul	1.5-2.5	Apparent	Dec-Apr	Moderate	Moderate.
2B, 2C, 2D-------- Appling	B	None--------	---	---	>6.0	---	---	Moderate	Moderate.
3B, 3C:									
Appling----------	B	None--------	---	---	>6.0	---	---	Moderate	Moderate.
Urban land-------	---	None--------	---	---	---	---	---	---	---
4B, 4C, 4D, 4B3--- Cecil	B	None--------	---	---	>6.0	---	---	Moderate	Moderate.
5A, 5B, 5C-------- Emporia	C	None--------	---	---	3.0-4.5	Perched	Nov-Apr	Moderate	High.
6D:									
Emporia----------	C	None--------	---	---	3.0-4.5	Perched	Nov-Apr	Moderate	High.
Slagle-----------	C	None--------	---	---	1.5-3.0	Perched	Nov-Apr	Moderate	High.
7B:									
Emporia----------	C	None--------	---	---	3.0-4.5	Perched	Nov-Apr	Moderate	High.
Urban land-------	---	None--------	---	---	---	---	---	---	---
8B, 8C, 8D, 8B3, 8C3---------- Georgeville	B	None--------	---	---	>6.0	---	---	High-----	High.
9B, 9C---------- Helena	C	None--------	---	---	1.5-2.5	Perched	Jan-Apr	High-----	High.
10B, 10C---------- Herndon	B	None--------	---	---	>6.0	---	---	High-----	High.
11B, 11C---------- Iredell	C/D	None--------	---	---	1.0-2.0	Perched	Dec-Apr	High-----	Low.
12A, 12B, 12C----- Mattaponi	C	None--------	---	---	3.0-6.0	Perched	Dec-Mar	High-----	High.
13B:									
Mattaponi--------	C	None--------	---	---	3.0-6.0	Perched	Dec-Mar	High-----	High.
Urban land-------	---	None--------	---	---	---	---	---	---	---
14A--------------- Myatt	D	Occasional	Brief-----	Nov-Mar	0-1.0	Apparent	Nov-Apr	High-----	High.
15B, 15C---------- Nansemond	C	None--------	---	---	1.5-2.5	Apparent	Dec-Apr	Moderate	High.
16A--------------- Roanoke	D	Occasional	Brief-----	Nov-Jun	0-1.0	Apparent	Nov-May	High-----	High.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
17A, 17B---------- Slagle	C	None---------	---	---	1.5-3.0	Apparent	Nov-Apr	Moderate	High.
17C---------- Slagle	C	None---------	---	---	1.5-3.0	Perched	Nov-Apr	Moderate	High.
18A---------- State	B	Occasional	Brief-----	Dec-Jun	4.0-6.0	Apparent	Dec-Jun	Moderate	High.
19B, 19C---------- Uchee	A	None---------	---	---	3.5-5.0	Perched	Jan-Apr	Low------	High.
20. Udorthents									

TABLE 17.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Altavista	Fine-loamy, mixed, thermic Aquic Hapludults
Appling	Clayey, kaolinitic, thermic Typic Kanhapludults
Cecil	Clayey, kaolinitic, thermic Typic Kanhapludults
Emporia	Fine-loamy, siliceous, thermic Typic Hapludults
Georgeville	Clayey, kaolinitic, thermic Typic Hapludults
Helena	Clayey, mixed, thermic Aquic Hapludults
Herndon	Clayey, kaolinitic, thermic Typic Hapludults
Iredell	Fine, montmorillonitic, thermic Typic Hapludalfs
Mattaponi	Clayey, mixed, thermic Typic Hapludults
Myatt	Fine-loamy, siliceous, thermic Typic Ochraquults
Nansemond	Coarse-loamy, siliceous, thermic Aquic Hapludults
Roanoke	Clayey, mixed, thermic Typic Ochraquults
Slagle	Fine-loamy, siliceous, thermic Aquic Hapludults
State	Fine-loamy, mixed, thermic Typic Hapludults
Uchee	Loamy, siliceous, thermic Arenic Hapludults
Udorthents	Udorthents

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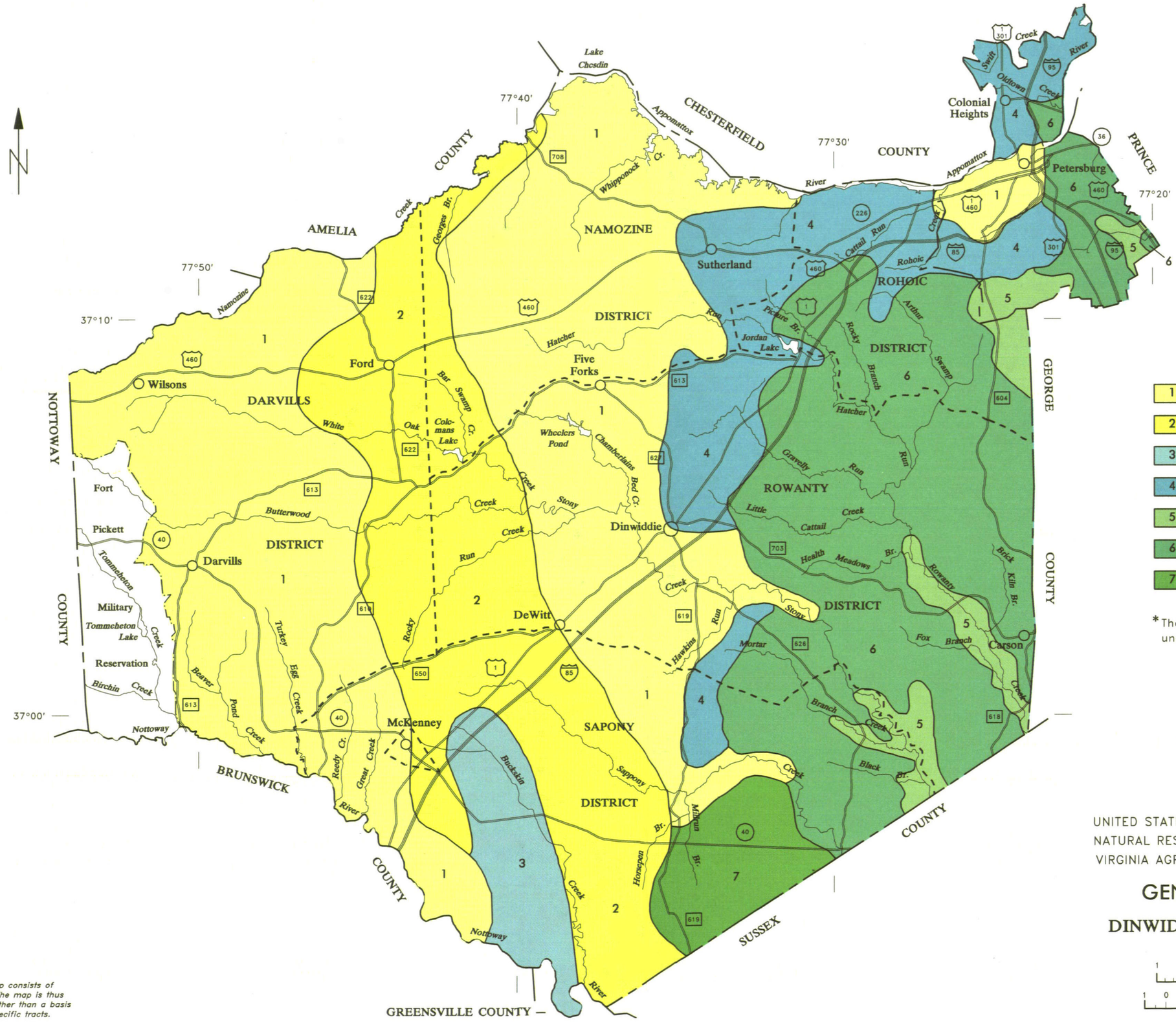


SOIL LEGEND *

1 APPLING–CECIL
2 HERNDON–GEORGEVILLE
3 IREDELL–HERNDON–GEORGEVILLE
4 MATTAPONI–APPLING–CECIL
5 ROANOKE–SLAGLE–MATTAPONI
6 EMPORIA–MATTAPONI–SLAGLE
7 MATTAPONI–EMPORIA–SLAGLE

*The units on this legend are described in the text under the heading "General Soil Map Units".

Compiled 1992

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
VIRGINIA AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

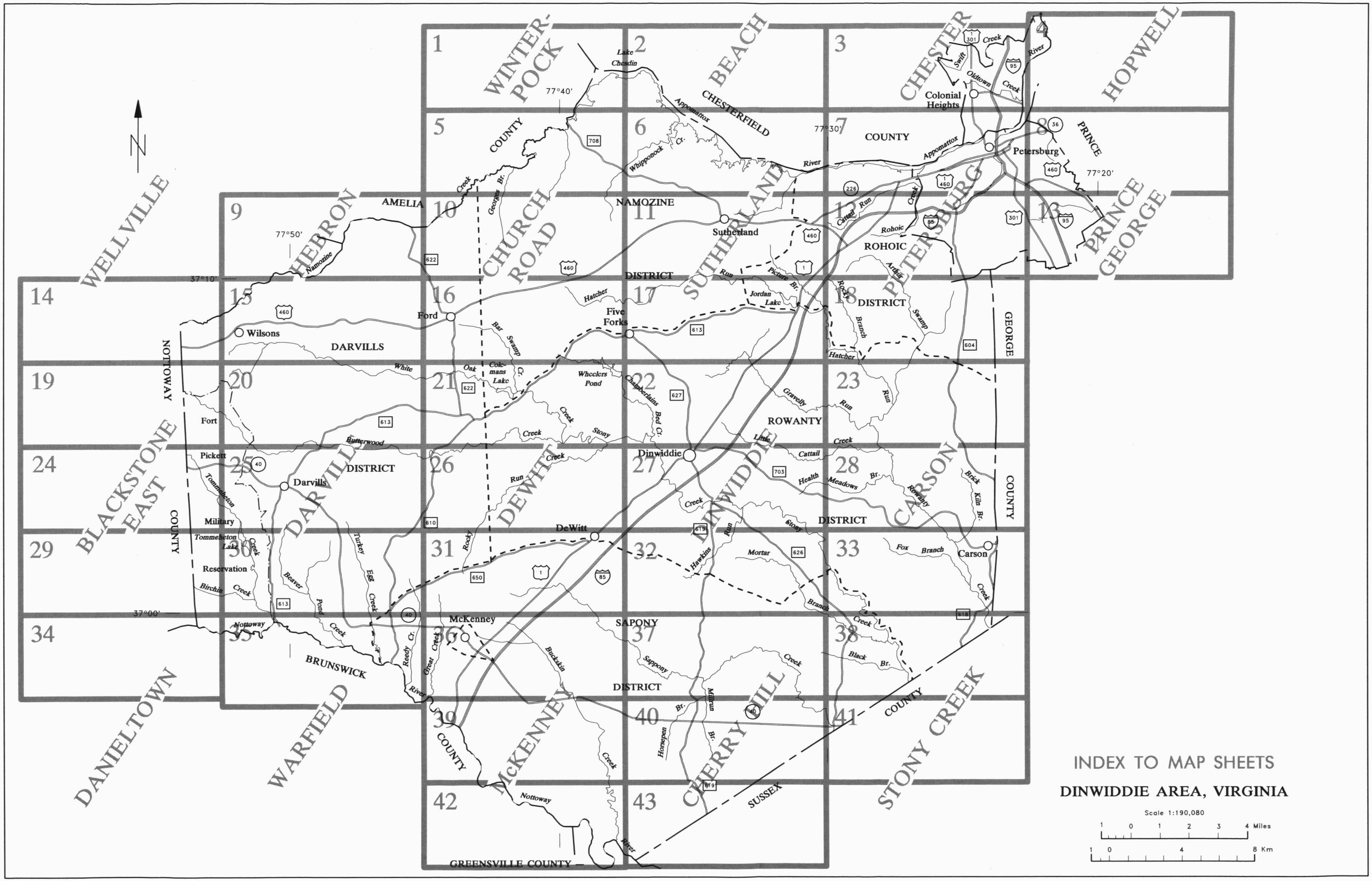
DINWIDDIE AREA, VIRGINIA

Scale 1:190,080

1 0 1 2 3 4 Miles

1 0 4 8 Km

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



INDEX TO MAP SHEETS
DINWIDDIE AREA, VIRGINIA
Scale 1:190,080
Miles
Km
WINTER-POCK
BEACH
CHESTER
HOPWELL
WELLVILLE
HEBRON
CHURCH ROAD
SUTHERLAND
PETERSBURG
PRINCE GEORGE
BLACKSTONE EAST
DARVILLS
DEWITT
DINWIDDIE
CARSON
DANIELTOWN
WARFIELD
McKENNEY
CHERRY HILL
STONY CREEK
CHESTERFIELD COUNTY
AMELIA COUNTY
NOTTOWAY COUNTY
BRUNSWICK COUNTY
GREENSVILLE COUNTY
SUSSEX COUNTY
PRINCE GEORGE COUNTY
NAMOZINE DISTRICT
ROHOIC DISTRICT
DARVILLS DISTRICT
ROWANTY DISTRICT
SAPONY DISTRICT
Colonial Heights
Petersburg
Sutherland
Ford
Wilsons
Five Forks
Dinwiddie
Darvills
DeWitt
Carson
McKenney
Fort Pickett Military Reservation

SOIL LEGEND

Map symbols consist of numbers or a combination of numbers and a letter. the initial numbers represent the kind of soil. A capital letter following these numbers indicates the class of slope. Symbols without a slope letter are for nearly level soils or miscellaneoous areas. A final number of 3 following the slope letter indicates that the soil is severely eroded.

SYMBOL	NAME
1A	Altavista fine sandy loam, 0 to 2 percent slopes, occasionally flooded
1B	Altavista fine sandy loam, 2 to 6 percent slopes, occasionally flooded
2B	Appling sandy loam, 2 to 7 percent slopes
2C	Appling sandy loam, 7 to 15 percent slopes
2D	Appling sandy loam, 15 to 25 percent slopes
3B	Appling-Urban land complex, 0 to 7 percent slopes
3C	Appling-Urban land complex, 7 to 15 percent slopes
4B	Cecil sandy loam, 2 to 7 percent slopes
4B3	Cecil clay loam, 2 to 7 percent slopes, severely eroded
4C	Cecil sandy loam, 7 to 15 percent slopes
4D	Cecil sandy loam, 15 to 25 percent slopes
5A	Emporia sandy loam, 0 to 2 percent slopes
5B	Emporia sandy loam, 2 to 6 percent slopes
5C	Emporia sandy loam, 6 to 10 percent slopes
6D	Emporia-Slagle complex, 10 to 25 percent slopes
7B	Emporia-Urban land complex, 0 to 6 percent slopes
8B	Georgeville silt loam, 2 to 7 percent slopes
8B3	Georgeville clay loam, 2 to 7 percent slopes, severely eroded
8C	Georgeville silt loam, 7 to 15 percent slopes
8C3	Georgeville clay loam, 7 to 15 percent slopes, severely eroded
8D	Georgeville silt loam, 15 to 25 percent slopes
9B	Helena loam, 2 to 7 percent slopes
9C	Helena loam, 7 to 15 percent slopes
10B	Herndon loam, 2 to 7 percent slopes
10C	Herndon loam, 7 to 15 percent slopes
11B	Iredell loam, 2 to 7 percent slopes
11C	Iredell loam, 7 to 15 percent slopes
12A	Mattaponi sandy loam, 0 to 2 percent slopes
12B	Mattaponi sandy loam, 2 to 6 percent slopes
12C	Mattaponi sandy loam, 6 to 10 percent slopes
13B	Mattaponi-Urban land complex, 0 to 6 percent slopes
14A	Myatt silt loam, 0 to 2 percent slopes, occasionally flooded
15B	Nansemond sandy loam, 2 to 6 percent slopes
15C	Nansemond sandy loam, 6 to 10 percent slopes
16A	Roanoke loam, 0 to 2 percent slopes, occasionally flooded
17A	Slagle sandy loam, 0 to 2 percent slopes
17B	Slagle sandy loam, 2 to 6 percent slopes
17C	Slagle sandy loam, 6 to 10 percent slopes
18A	State fine sandy loam, 0 to 2 percent slopes, occasionally flooded
19B	Uchee loamy sand, 0 to 6 percent slopes
19C	Uchee loamy sand, 6 to 10 percent slopes
20	Udorthents, 0 to 25 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state, or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline
- AD HOC BOUNDARY (label) — Davis Airstrip
- Small airport, airfield, park, oilfield, cemetery, or flood pool — FLOOD POOL LINE
- STATE COORDINATE TICK — 1 890 000 FEET
- LAND DIVISION CORNER (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 173
- Federal — 287
- State — 52
- County, farm or ranch — 1283

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or Small (Named where applicable) — water, w

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban area) (occupied)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water, w
- Intermittent — int, i

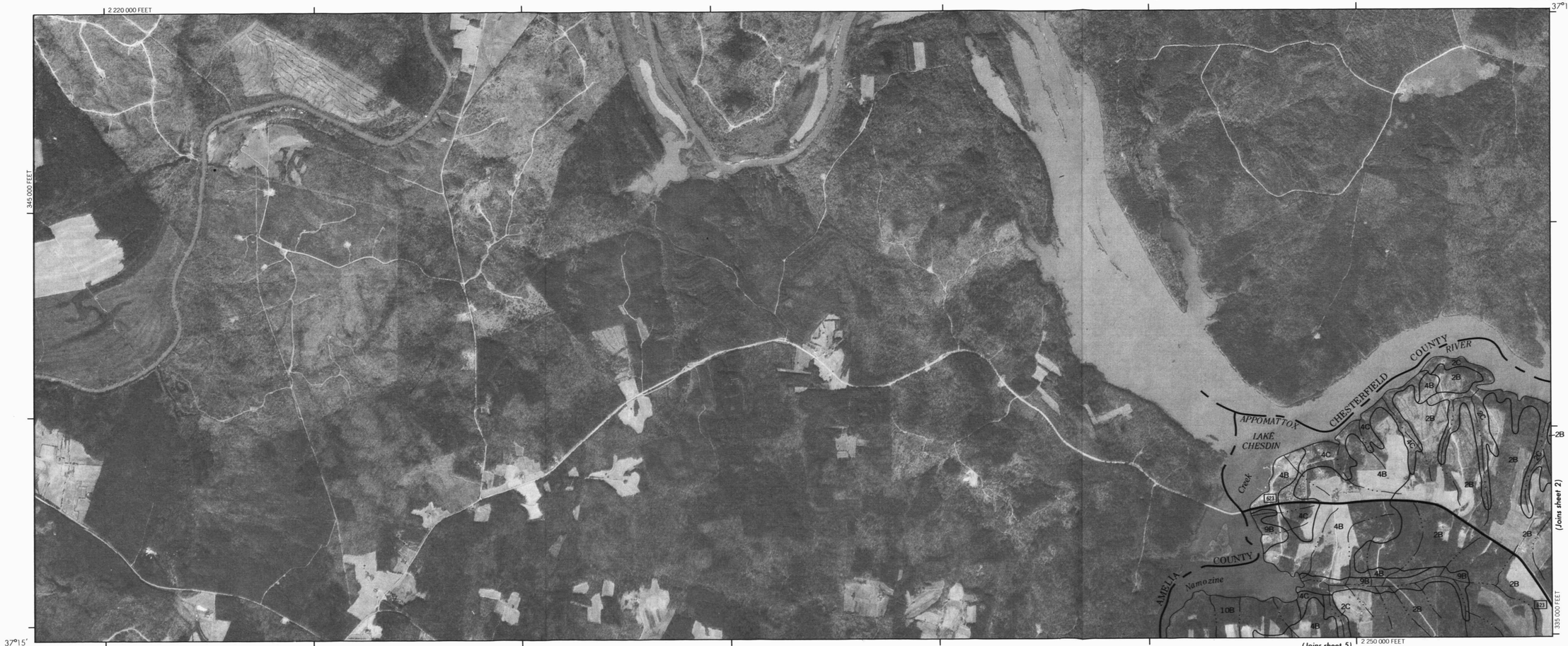
MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

- SOIL DELINEATIONS AND SYMBOLS — 3 52
- ESCARPMENTS
  - Bedrock (points down slope)
  - Other than bedrock (points down slope)
- SHORT STEEP SLOPE
- GULLY
- DEPRESSION OR SINK
- SOIL SAMPLE (normally not shown) — S
- MISCELLANEOUS
  - Blowout
  - Clay spot
  - Gravelly spot
  - Gumbo, slick or scabby spot (sodic)
  - Dumps and other similar non soil areas
  - Prominent hill or peak
  - Rock outcrop (includes sandstone and shale)
  - Saline spot
  - Sandy spot
  - Severely eroded spot
  - Slide or slip (tips point upslope)
  - Stony spot, very stony spot

SOIL SURVEY OF DINWIDDIE AREA, VIRGINIA — SHEET NUMBER 1



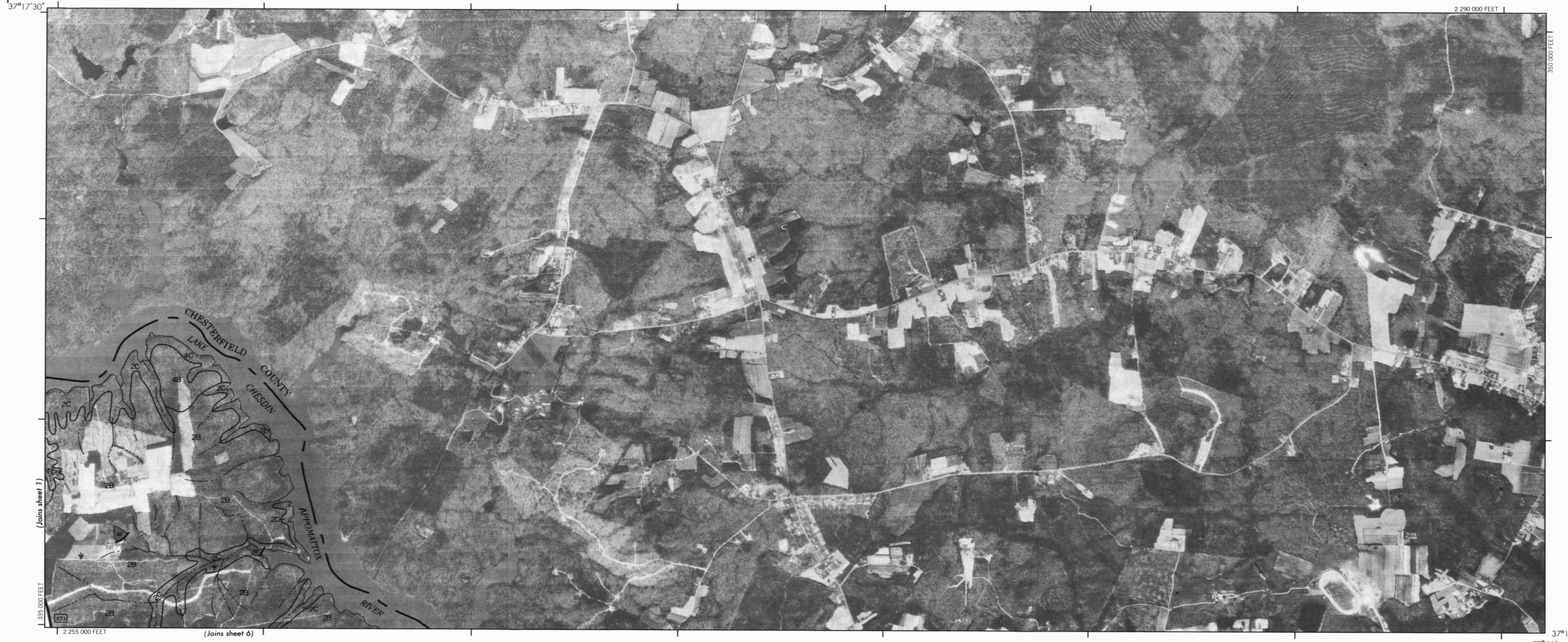
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

1

N



1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 2

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SOIL SURVEY OF DINWIDDIE AREA, VIRGINIA — SHEET NUMBER 3

3

N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 3

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1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 4

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N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDIE COUNTY, VIRGINIA NO. 5

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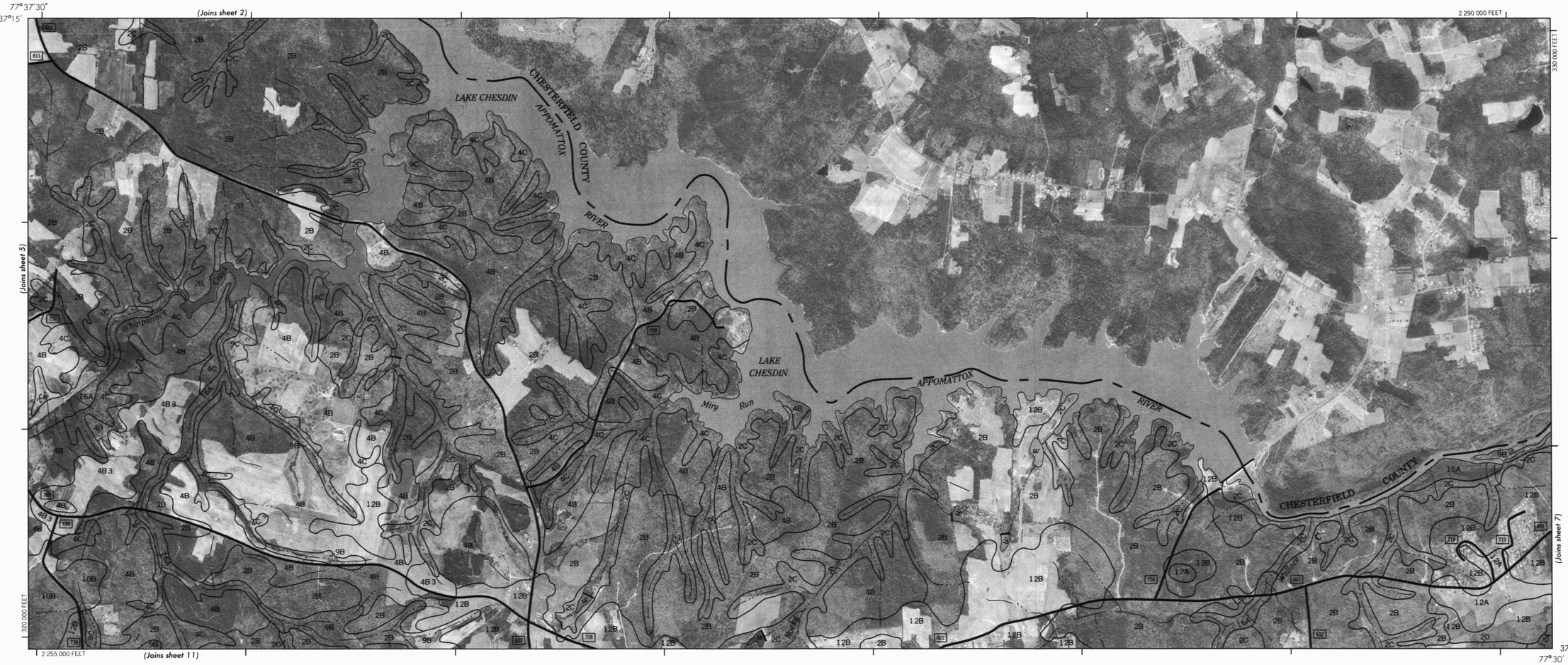

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDIE COUNTY, VIRGINIA NO. 6

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N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 7

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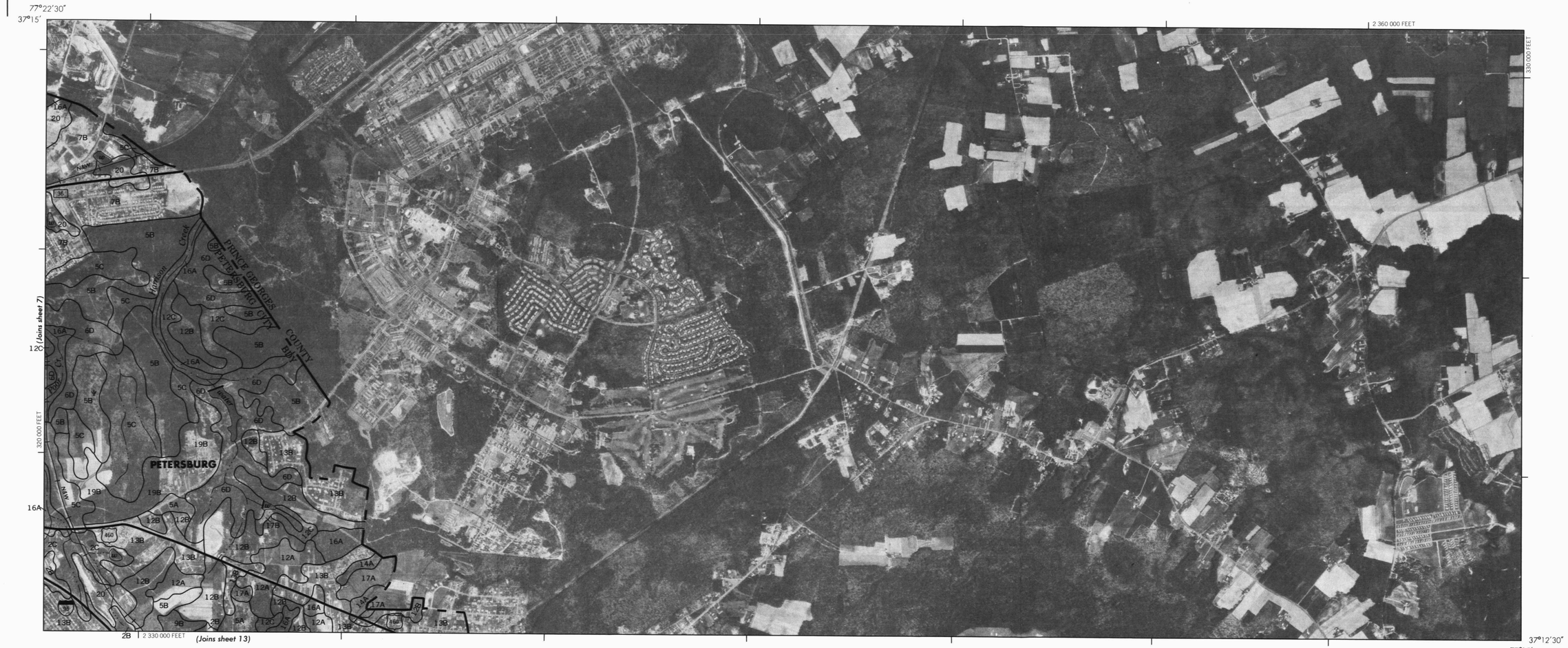

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 8

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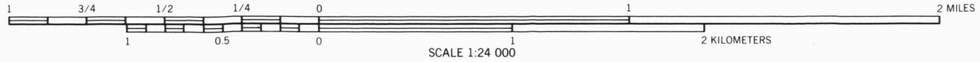
DINWIDDLE COUNTY, VIRGINIA NO. 9



SCALE 1:24 000

9

N

DINWIDDIE COUNTY, VIRGINIA NO. 10

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N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 11

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1 3/4 1/2 1/4 0 1 2 MILES

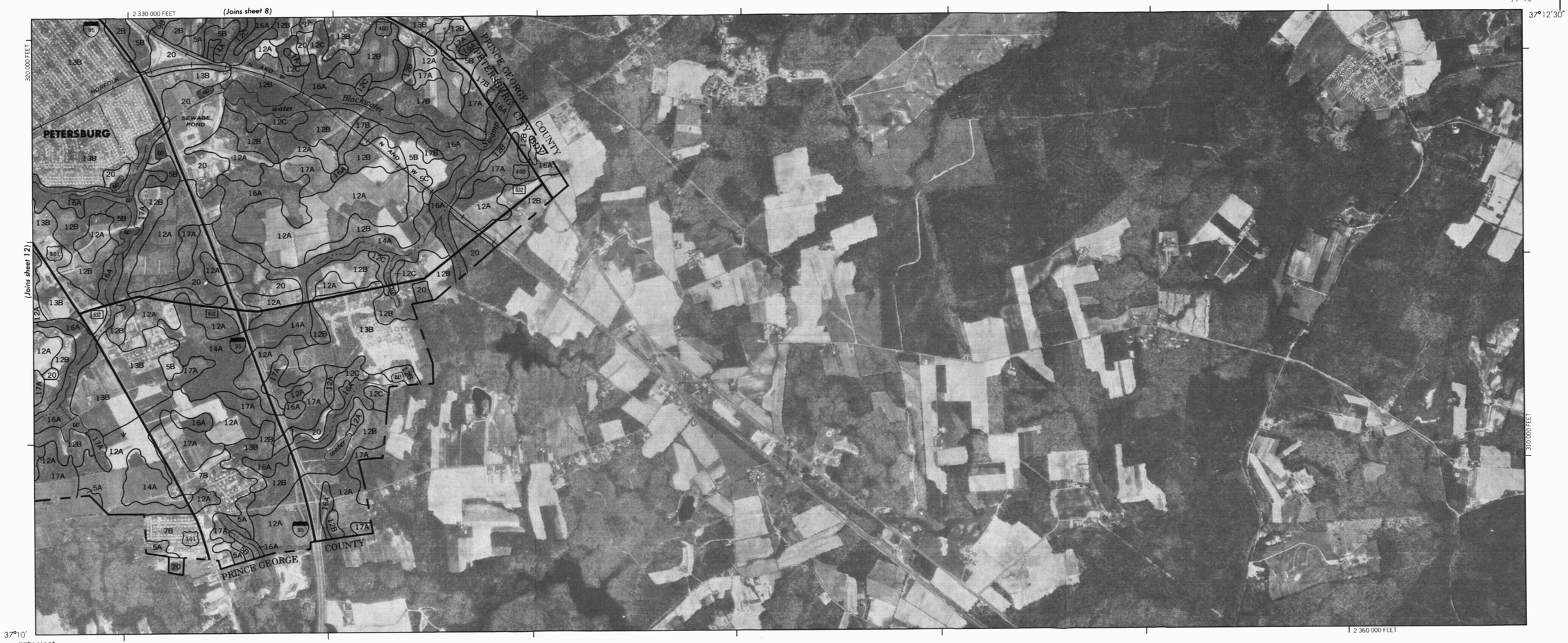
1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 12

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N



1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 13

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

78°00'
37°10'

2 180 000 FEET

300 000 FEET

290 000 FEET

2 150 000 FEET

NOTTOWAY COUNTY

DINWIDDLE COUNTY

Namozine Creek

MORPOLK AND WESTERN

(Joins sheet 15)

2C (Joins sheet 19)

37°07'30"
77°52'30"

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 14

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

DINWIDDLE COUNTY, VIRGINIA NO. 15

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

SOIL SURVEY OF DINWIDDIE AREA, VIRGINIA — SHEET NUMBER 16

N

1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

DINWIDDIE COUNTY, VIRGINIA NO. 16

N

DINWIDDLE COUNTY, VIRGINIA NO. 17

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

1 3/4 1/2 1/4 0 1 2 MILES

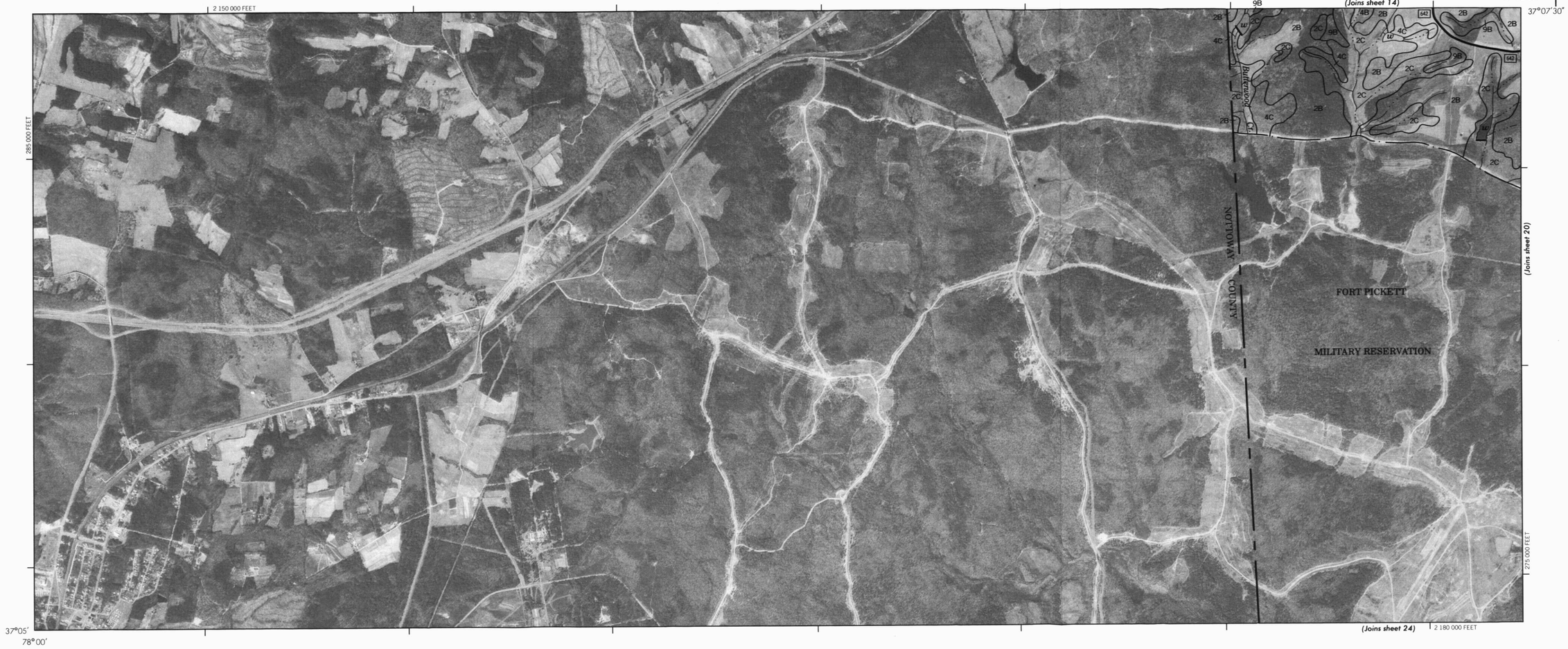
1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDIE COUNTY, VIRGINIA NO. 18

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N



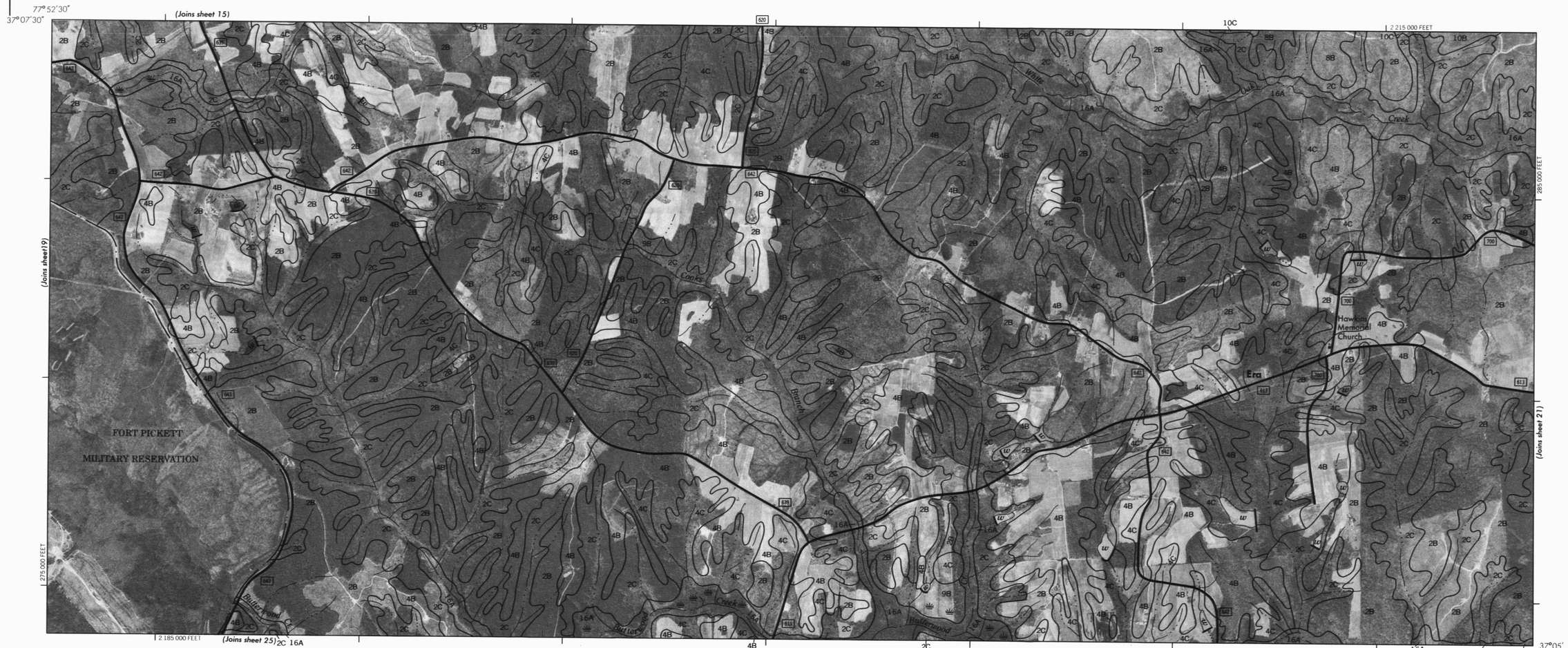
1 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

DINWIDDIE COUNTY, VIRGINIA NO. 19



1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 20

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 21

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

77°37'30"
37°07'30"

(Joins sheet 17)

2 290 000 FEET

(Joins sheet 21)

285 000 FEET

(Joins sheet 23)

275 000 FEET

(Joins sheet 27)

2 260 000 FEET

37°05
77°30'

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 22

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 23

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

24

N

78°00'

37°05'

(Joins sheet 19)

2 180 000 FEET

270 000 FEET

(Joins sheet 25)

260 000 FEET

2 150 000 FEET

(Joins sheet 29)

37°02'30"

77°52'30"

FORT PICKETT MILITARY RESERVATION

NOTTOWAY COUNTY

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 24

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 25

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographic maps prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 26

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 27

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDIE COUNTY, VIRGINIA NO. 28

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 29

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

1 3/4 1/2 1/4 0 1 2 MILES

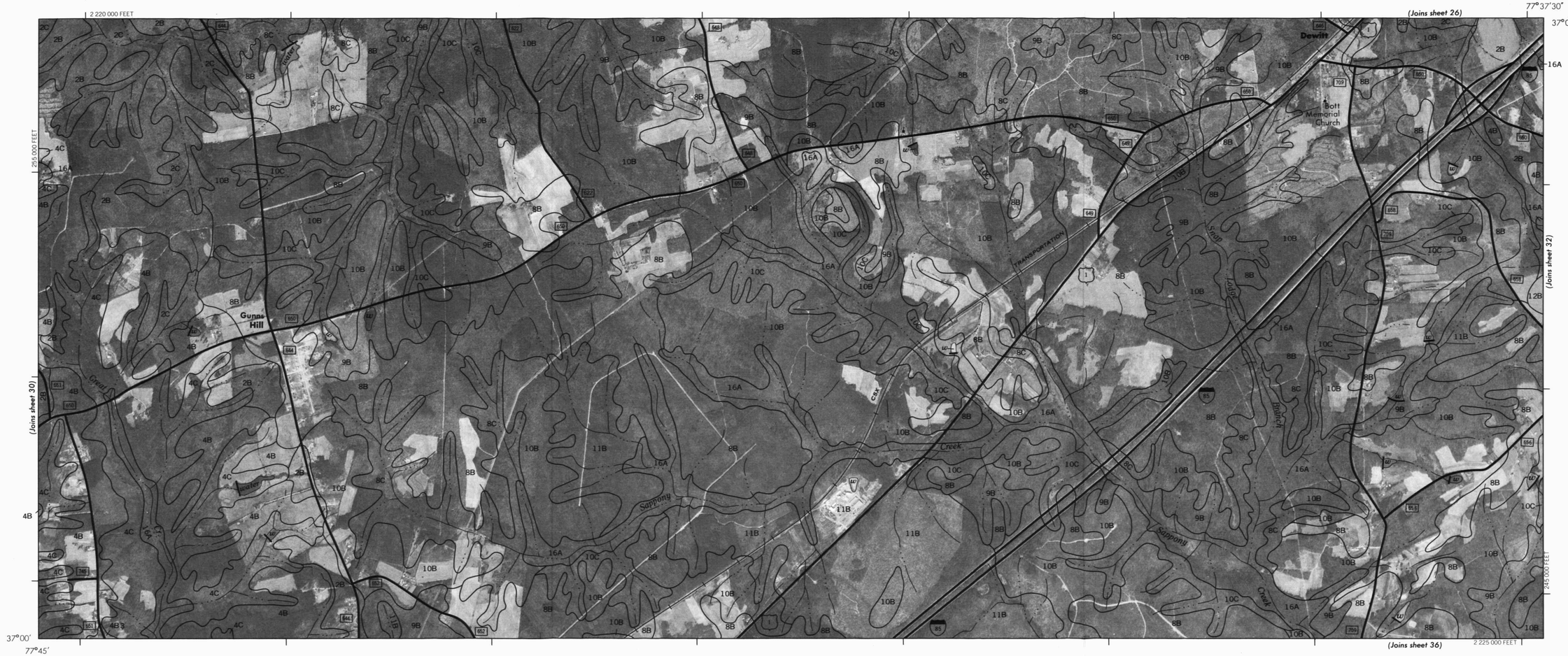
1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 30

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N



1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 31

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

1 3/4 1/2 1/4 0 1 2 MILES

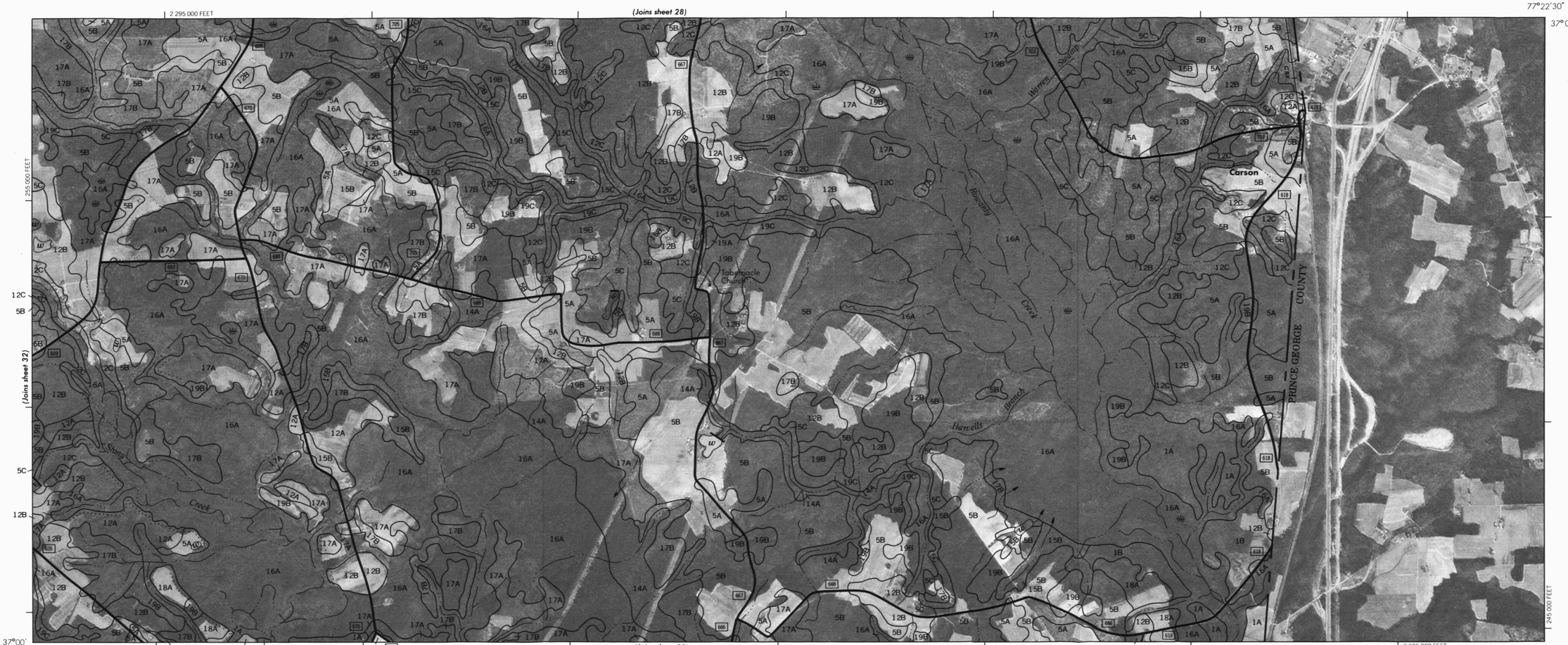
1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 32

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N



1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 33

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

34

N

78°00′
37°00′

36°57′30″
77°52′30″

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDIE COUNTY, VIRGINIA NO. 34

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDIE COUNTY, VIRGINIA NO. 35

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

1 3/4 1/2 1/4 0 1 2 MILES

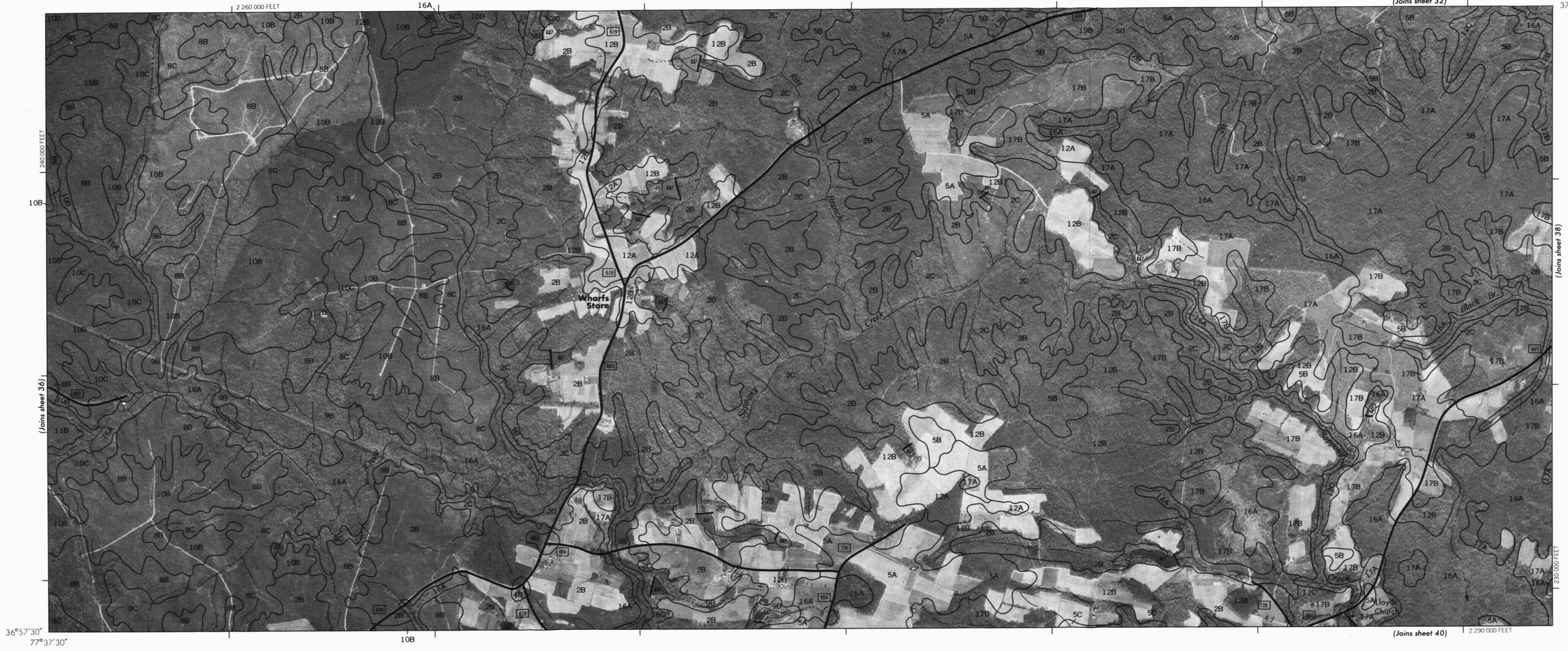
1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDIE COUNTY, VIRGINIA NO. 36

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N



1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 37

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

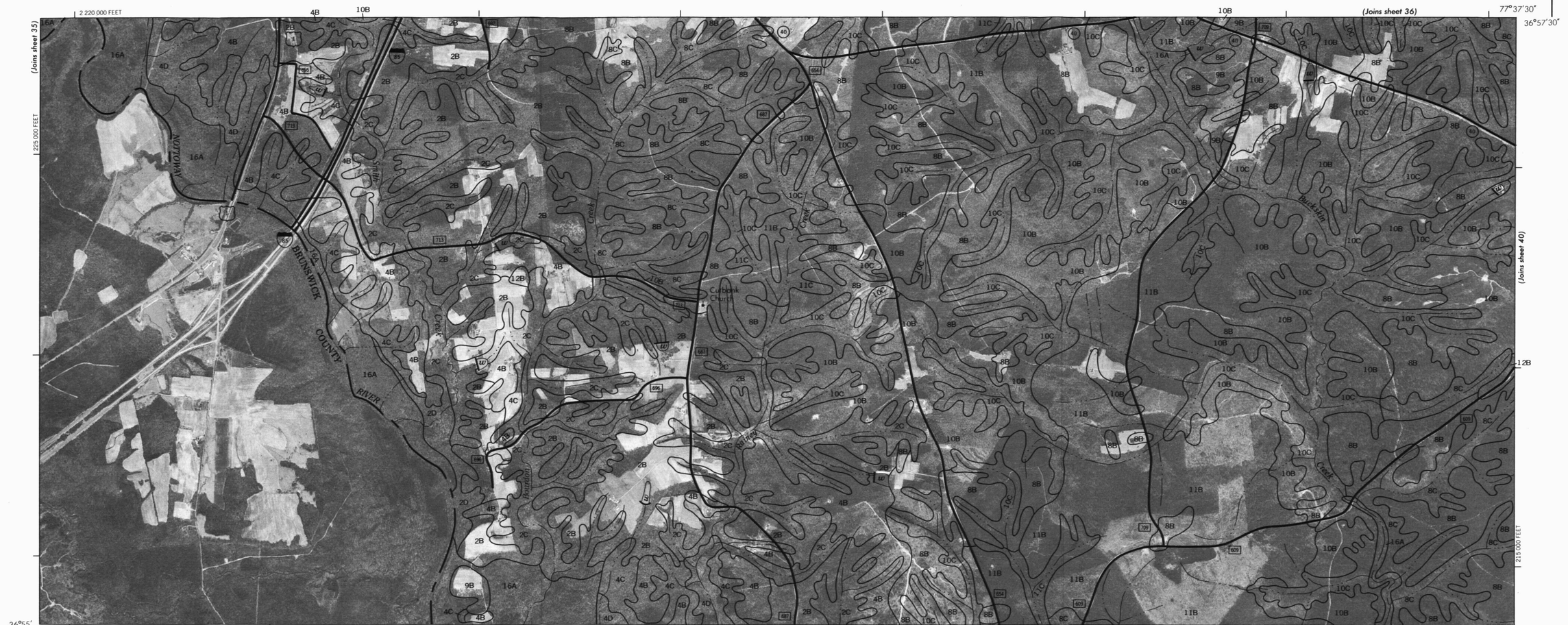
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 38

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



DINWIDDLE COUNTY, VIRGINIA NO. 39

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDIE COUNTY, VIRGINIA NO. 40

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 41

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

1 3/4 1/2 1/4 0 1 2 MILES

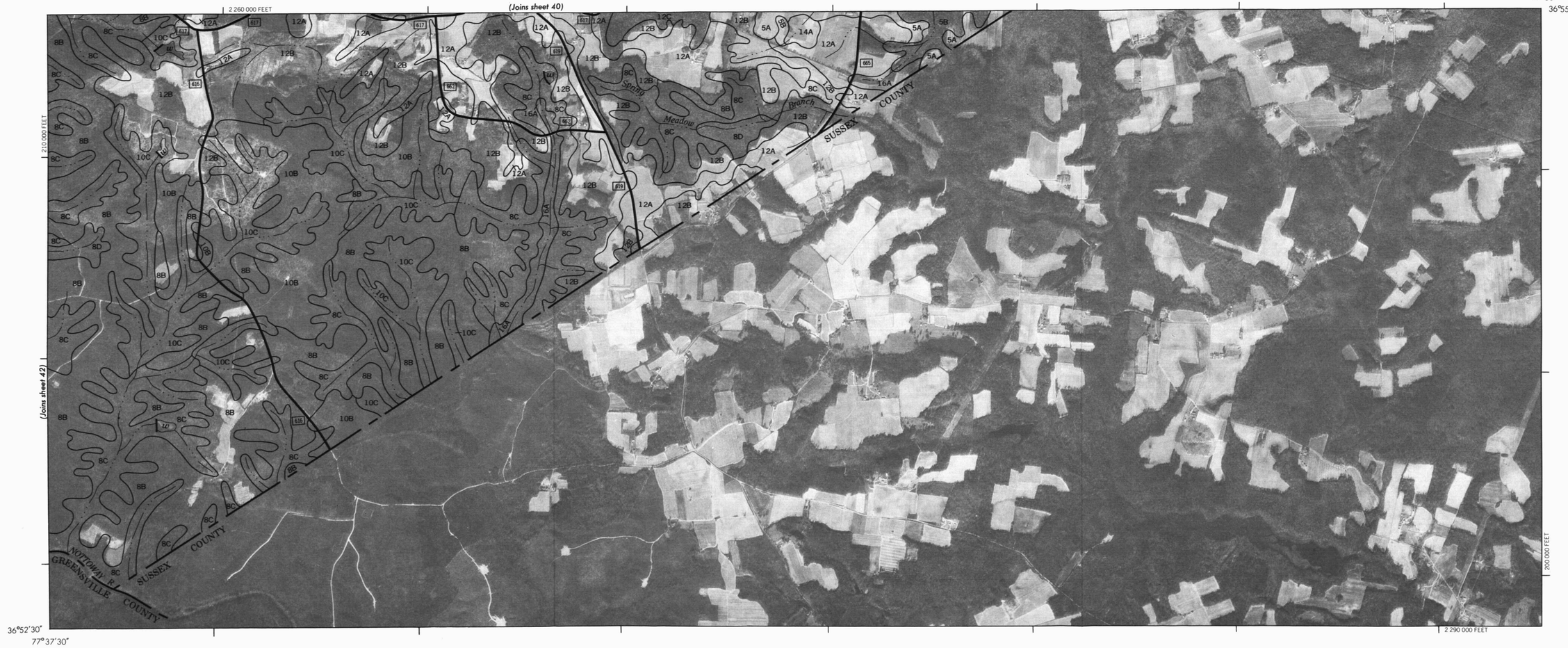
1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDIE COUNTY, VIRGINIA NO. 42

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N



1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

DINWIDDLE COUNTY, VIRGINIA NO. 43

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 - 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.